

JPRS-TND-86-024

3 NOVEMBER 1986

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

FBIS FOREIGN BROADCAST INFORMATION SERVICE

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WORLDWIDE REPORT

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HONG KONG

DUTCH DAIRY PRODUCTS RADIOACTIVITY AT 'SAFE LEVEL'

Hong Kong HONGKONG STANDARD in English 23 Sep 86 p 2

[Text]

DUTCH dairy products sold in Hongkong contain only harmless levels of radioactivity resulting from the Chernobyl nuclear disaster, according to a member of the Dutch Ministry of Agriculture and Fisheries.

Dr Alfred Feberwee spoke in Hongkong yesterday as part of a Far Eastern tour aimed at convincing importers of Dutch food that levels of radioactivity are well below internationally accepted safety standards.

The tour followed a decision by the Philippine Government earlier this month to ban the products because of fear over high radioactivity levels.

The European Economic Community (EEC) agreed on June 1 to impose a radioactivity safety limit of 370 units per litre for liquids and 600 units per kilogram for solid food.

Dr Feberwee said milk produced now in Holland is

contaminated with about five units per litre of radioactive cesium.

"So we are well below the EEC limit," Dr Feberwee said.

However, he acknowledged that radioactive levels just after the Chernobyl disaster in early May were much higher.

"Initially we were faced with the problem of radioactive iodine which has a half-life decay rate of eight days," he said.

He explained that this meant the intensity of the radioactivity diminished by 50 percent every week or so and therefore posed only a short-term problem.

"All our milk was screened and any batch that was found to contain more than 500 (units per litre) was discarded," he said, adding that this more highly contaminated milk would only have reached Hongkong if it had been flown to the territory.

"As it is, all our milk is transported here by sea, so the (radioactive) iodine would have decayed by the time it got here," he said.

It had been reported earlier that levels of the substance in certain areas of Holland were as high as 250,000 units per square metre.

While radioactive cesium-137 did not appear in large quantities in the fall-out from the disaster, it is now almost the only traceable radioactive substance to be found in Holland due to its much longer 30-year half-life.

During his short stay in Hongkong Dr Feberwee also met Dr Ron Perry, the Government Hygiene Adviser, and officials of the Consumer Council.

He flies on to Taipei today.

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CSO: 5150/0024

HONG KONG

PRC VISITOR SAYS IAEA TO INSPECT DAYA BAY PLANT

Hong Kong HONGKONG STANDARD in English 16 Sep 86 p 3

[Article by Yau Shing-mu]

[Text]

CHINA will throw open the door of the Daya Bay nuclear plant for inspection by the International Atomic Energy Agency, as the power station will have little military value.

This was recently disclosed by the chief engineer of Fast Breeder Reactors at Beijing's Ministry of Nuclear Industry, Mr Xu Mi, who, with other members of the China Nuclear Society, is in Hongkong for the current Nuclear Technology Exhibition.

Two factors have underscored China's decision to allow IAEA safeguards to be implemented and inspected at Daya Bay: the Chernobyl incident and the local uproar over the safety of the nearby nuclear plant.

Though China has been a member of the Vienna-based United Nations-affiliated organisation for two years, it objected to the safeguards as an undue intrusion on its sovereignty until last month.

The IAEA has developed a programme of on-site inspections, audits, and inventory controls, known collectively as "safeguards" which are widely regarded primarily as a bulwark against the spread of nuclear arms.

Mr Xu told *The Standard* the reactors usually employed for producing weapons-grade plutonium (Pu-239) are different from the pressurised water reactors like the one to be installed at Daya Bay.

China's second nuclear bomb was made of Pu-239.

If China were to use the Daya Bay plant to produce Pu-239, it would cost quite a lot and defeat the economic purpose of the plant, he said.

After slow consumption of nuclear fuel, rather than the fast reaction in Pu-239 producing process, the plant will produce plutonium-240 and a series of other radioactive isotopes.

Some of them will be extracted for other uses but, Mr Xu said, they

would have little military value.

"Thus, we accepted the IAEA to apply safeguards to the Daya Bay plant. It is the only nuclear project in China under the IAEA safeguard application," Mr Xu said.

He said, however, China has already developed a whole system of nuclear weapon technology and production lines.

He said China has more than 10 reactors but he declined to divulge further. He said the exact number and location of other reactors are national security-classified information.

What he could tell was that there are four institutes at where nuclear research is being conducted. Two are in Beijing: the Institute of Atomic Energy and at Qinghua University, the third in Shanghai and the fourth in Sichuan.

Moreover, he said China has its own uranium-enrichment facilities capable of meeting the needs of atomic bomb manufacturing. But he declined to reveal their capacities and locations.

/12379

CSO: 5150/0026

HONG KONG

IAEA AGREEMENT ON NOTIFICATION BENEFITS HONG KONG

Hong Kong HONGKONG STANDARD in English 29 Sep 86 p 1

[Text]

HONGKONG will benefit from a recent 50-country agreement on procedures following a nuclear accident, a senior Government official said yesterday.

In a special session of the International Atomic Energy Agency (IAEA) held last week, more than 50 countries — including China and Britain — agreed to immediately notify and assist each other in the event of a nuclear accident.

Although Hongkong is not a member of the international body, which only accepts sovereign states as members, the agreement will be beneficial to the territory, said Mrs Emmeline Mok, Principal Assistant Secretary for Economic Services.

Her comments followed her return from the conference in Vienna where she was sent by the Government as an observer under the British delegation.

Mrs Mok said she was impressed by the willingness of the attending countries to participate in the agreement signed during the session held from September 24 to 26.

Her trip cemented valuable contacts between the Government and the IAEA, she said.

The IAEA's session was called in response to the Chernobyl disaster in the Soviet Union earlier this year and was attended by about 700 delegates from as many as 60 countries.

/12379

CS0: 5150/0031

HONG KONG

BRITISH ATTITUDE TOWARD DAYA BAY PROJECT STUDIED

Thatcher Remarks to Youde

Hong Kong HONGKONG STANDARD in English 11 Sep 86 p 1

[Article by Sheila Dawes]

[Text] **THE British Government has conveyed to Beijing the concerns of the Hongkong people over the Daya Bay nuclear plant project on "several occasions", Prime Minister Margaret Thatcher revealed in a press statement yesterday.**

Mrs Thatcher made the remarks after an hour-long meeting with the Governor, Sir Edward Youde, and his six-member delegation at her official residence at 10, Downing Street.

Mrs Thatcher reassured Sir Edward and his delegation that the Chinese government would make "every effort" to "ensure that the...construction, operation and management of the plant would be carried out to the highest possible safety standards."

Despite the outward show of confidence, it is believed that British ministers feel that the Hongkong Government has a major public relations task on its hands in calming local anxieties over the project, which is to be located some 50 km from Hongkong.

Some have even gone to the extent of speculating that current sentiment against the \$27-billion project may be even more damaging to the morale and confidence of Hongkong than the anxieties created just before the announcement of the Sino-British Joint Declaration two years ago in which London agreed to have

Hongkong revert to Chinese rule in 1997.

Sir Edward and his delegation are in London to brief Mrs Thatcher and her top government officials over a range of issues involving Hongkong.

His delegation includes Sir Michael Sandberg, Senior Umelco member Miss Lydia Dunn, Mr Chen Shou-lum, Miss Maria Tam, Mr Allen Lee and Mr Oswald Cheung.

All six are members of the Executive Council, popularly dubbed the "Governor's Cabinet."

Miss Tam and Mr Lee, who led separate Legislative Council nuclear fact-finding missions abroad following public uproar over the project, are due to visit Beijing on September 18 for discussions with top Chinese officials.

In what has been considered as a shrewd public relations move, China invited 11 members of the fact-finding missions for a three-day visit to discuss their report on the missions.

Although Daya Bay was the fifth item on Mrs Thatcher's press statement yesterday, it is believed to have taken up the lion's share of the meeting.

Sir Edward is also understood to have spent much of Tuesday's meeting with the Minister of State for the Foreign and Commonwealth Office, Mr Timothy Renton, discussing the Daya Bay issue.

Mrs Thatcher also touched on the review of representative government in Hongkong next year by reaffirming Britain's commitment to it and confirmed that "full account would be taken of the views of the people of Hongkong when drawing conclusions from the review."

The statement referred to the progress of work in implementing the Joint Declaration over the 15 months since the accord came into effect.

Interview with 'Official Sources'

Hong Kong, SOUTH CHINA MORNING POST in English 12 Sep 86 p 1

[Article by John Beasant]

[Text]

A MAJOR accident at the Daya Bay nuclear plant Hongkong is a real though exceedingly remote possibility - but if it did happen, it would be impossible to evacuate Hongkong's six million people.

An exclusive interview in Britain yesterday with highly-placed sources close to the United Kingdom Atomic Energy Authority at Harwell revealed that any plan to evacuate Hongkong's residents would be "beyond comprehension" and "logistically impossible".

But the sources told the *South China Morning Post* that an evacuation plan was politically and socially essential, following the Chernobyl accident and an upsurge in public concern over Daya Bay.

The *Post* was granted the interview after the release of a top-level Government report to *Post* reporters last week.

The report revealed the Hongkong Government had failed to set up a co-ordinated science and technology team here, after the contract of its science adviser, Dr John Wright, ran out in June 1984.

Several Government officials admitted last week the Government still did not have a science and technology adviser and there was no head scientist in Hongkong to co-ordinate information on Daya Bay.

The science and technology team, according to a local source, would have provided top-ranking scientific information on Daya Bay to the Government and Harwell and it would have stymied Government and public criticism of the Harwell reports.

Reaction

In yesterday's interview, the British sources claimed:

- The Hongkong administration's criticism of the Harwell report was "the reaction of a Government under pressure."

- The Hongkong Government was "not informed" and "has not worked in such areas" of high technology before.

- The sources said "there were constraints set by the terms of the contract with the Government of Hongkong, time that could be spent being one of them, which of course the overall cost would reflect."

- The Hongkong Government and the public were initially unconcerned about the Daya Bay project but the Government attitude changed dramatically after the Chernobyl accident.

"The change in public concern after the accident at Chernobyl made it necessary for the Government of Hongkong to determine to accommodate this upsurge in public alarm over the Daya Bay complex," they said.

"This was reflected in the need for Harwell to assess at best it could the possible damage that would be sustained by Hongkong in the event of an accident at Daya Bay."

This part of the relevant report, while being highly classified, was definitely leaked.

It was soon apparent, for example, that the Hongkong Observators had a copy within days.

The sources said that in 1984, the AERE (Atomic Energy Research Establishment) Harwell was approached by the Government of Hongkong which was seeking advice and guidance on preparing itself for living with Daya Bay.

It was stressed that no widespread public concern existed in

Hongkong itself, but that the Government did want to reinforce the scientific and technical advice available to it.

It needed assistance also in training those members of its scientific staff it would later identify as a small number - who would eventually be responsible for operating a radiological protection system for the territory.

There was of course a dramatic change in public concern worldwide post Chernobyl," said the sources.

Constraints

"The advice that was rendered in the reports prepared by Harwell for the Government of which there are several, was written by experts in their particular fields."

"There were constraints set by the terms of the contract with the Government of Hongkong, time that could be spent being one of them, which of course the overall cost would reflect."

The report has two phases:

Phase one defined a preliminary assessment of the effects on Hongkong of an accident at Daya Bay.

Phase two, which has yet to start, will be more comprehensive and based on more detailed information to be supplied to Harwell by the Hongkong Government.

Asked about comments in Hongkong that the reports lacked depth, one source said that "with the greatest of respect, Hongkong is not an informed customer of ours. It has not worked in such areas before. Nuclear power is a high technology matter, relatively of an unknown quantity in Hongkong, Government circles."

"These criticisms of the report is, in my opinion, the reaction of Government under pressure."

The source said the phase one report did exactly what it set out to do, and represented an honest scientific appraisal.

"The possibility of an accident occurring at Daya Bay, such as took place at Chernobyl, is exceedingly remote."

"It must be stressed that the safety standards at Chernobyl were far from satisfactory; they were not good at all."

The sources said that in the event of a major accident at Daya Bay, the Chinese authorities would have to evacuate people from within a 10 km radius of the plant.

Although Hongkong was 80 km from Daya Bay, the territory would fall within a 10 km wide corridor which would need to be evacuated because of radioactivity carried by the prevailing wind.

Nonetheless, the Government of Hongkong needed to have qualified, technical people who could respond to the realities prompted by Daya Bay's existence.

Said one source: "The Hongkong administration has no background in dealing with and responding to the realities of nuclear power."

Real need

"There exists a very real need, at the political and the social level, to have a contingency plan, one which would cater for the remote possibility of an accident at Daya Bay actually coming to pass."

"In my view there is no technical need but, on the imperative to which I have just referred, the need is there and should be met."

"The problem, of course, of evaluating six million people at

short notice, is frankly beyond comprehension."

"But phase two, based on information which will have to be given to us by the Hongkong Government, will deal with, essentially, what can only be termed a reactor accident assessment report relating, of course, to the circumstance of Hongkong."

"But given the realities of evaluating six million it is envisaged that it will not be full blooded."

The sources said Harwell's contract with the Hongkong Government required it to make an appraisal of a plan for background radioactive monitoring, to advise on the equipment that such a plan would need, to advise on public education, to assess the consequences to Hongkong of an acci-

dent at Daya Bay, to advise on contingency planning and train some of their staff.

"In short, the Government of Hongkong works, quite rightly, to make use of Harwell's technical knowledge gained over 30 years."

"We have recommended that various monitoring teams be established, to operate in the case of an accident."

"That is, that an emergency organisation exist, including for example, a process of quick and effective media liaison, a quick and effective dissemination of public information."

"This is all part, of course, of having a contingency plan. The organisation need not be full time, otherwise the cost would be prohibitive. It would operate like civil defence."

British Commitment to Plant

Hong Kong SOUTH CHINA MORNING POST in English 13 Sep 86 p 2

[Text]

THE British Government is committed to the Daya Bay nuclear plant — although the deep concern of Hongkong people has been fully taken into account, Executive Council member Miss Maria Tam said yesterday.

"The British Government is going ahead with the nuclear plant as part of its energy policy and Britain is committed to using the plant," she said.

However, Miss Tam said the British Government is "definitely sympathetic" to the controversy and the deep concern of the Hongkong people on the plant's safety aspects.

British Prime Minister Mrs Margaret Thatcher has already said the Government

is confident the Daya Bay plant will be constructed and operated to the highest possible safety standards.

Miss Tam returned alone last night from London after she and her Exco colleagues, led by the Governor, Sir Edward Youde, briefed British ministers on Hongkong's latest developments and public feeling on the nuclear plant issue.

Sir Edward and other Exco members are expected to return today.

On the Chinese invitation to the members of the Legislative Council's nuclear fact-finding delegations to visit Beijing later this month, Miss Tam said she hopes she will come back with more guarantees on the plant's safety.

The Legco members will explain to the Chinese leaders the fact-finding reports and a position paper will be presented to the Chinese leaders expressing the concern of the people of Hongkong, she said.

The importance of next year's review of the political structure in Hongkong was also discussed by the Exco members in London.

Miss Tam said the British Government was committed to the 1987 review.

On Hongkong's mood in favour of direct elections, Miss Tam said details of the political review had not been touched on in London, although direct polls were one form of election to be discussed in the review.

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CSO: 5150/0025

HONG KONG

REPORTAGE ON DAYA BAY STUDY TEAM'S VISIT TO PRC

Price of Power Discussed

Hong Kong HONGKONG STANDARD in English 19 Sep 86 p 2

[Article by Andy Ho]

[Text] CHINESE officials have refused to assure the Legco delegation in Beijing that future supplies to Hongkong of nuclear-generated power will not be more expensive than that from coal-fired generators throughout the 30-year life span of the Daya Bay nuclear power plant.

This was one of the requests councillors put forward to the Chinese authorities in one of the 30 observations of their 213-page fact-finding report on nuclear power generation.

Under present arrangements the Guangdong nuclear power joint venture company has only given an assurance that 45 percent of the power they will be selling to the China Light and Power Co will not be more costly than conventionally-generated electricity.

Mr Allen Lee, leader of the Legco delegation, said the nine-member Chinese team told the visiting councillors during discussions yesterday that there were two main reasons for their decision.

He said the Chinese team pointed out that it will take seven years to build the Daya Bay plant and that they have already given a six-year price guarantee.

The Chinese delegates said it was likely that during these 13 years fossil fuel will become increasingly scarce and, therefore, more costly.

They expect nuclear generated power will not be more expensive in comparison even after the six-year period.

They added that the Guangdong Nuclear Investment Co, a 75 percent partner in the Guangdong Nuclear Power Joint Venture Company, has already offered favourable terms, as the first six years of operation are expected to be most costly throughout the plant's lifespan.

Another leader of the Legco team, Miss Maria Tam, said the Chinese have agreed to authorise the Guangdong and Shenzhen authorities to discuss directly with the Hongkong Government the suggestion that a cross-border agreement be signed between the two places to monitor the operation of the plant.

Meeting with Nuclear Safety Officials

Hong Kong SOUTH CHINA MORNING POST in English 20 Sep 86 pp 1, 2

[Article by Albert Chan]

[Text]

A SENIOR Chinese nuclear official said yesterday it was "inappropriate" for Mr Jiang Shenjie to head the country's nuclear licensing authority and at the same time retain his post in the Nuclear Industry Ministry (NIM).

In a rare and frank comment on the possible conflict of interest of Mr Jiang in his

dual role, Mr Ma Fuhang said the present arrangement was inevitable because of limits in resources in the nuclear industry.

He said no one was sure when or if Mr Jiang would relinquish his role in the NIM.

"It would be up to the highest authority to decide," he said.

Mr Ma is the director of the Nuclear Electricity Bus-

reau of the NIM and is also a director on the board of the Guangdong Nuclear Power Joint Venture Company, which is a merger of Hongkong's China Light and Power Company and its Chinese counterpart.

The company was set up to build and run the Daya Bay nuclear power plant and is under the control of the NIM.

China set up the National Nuclear Safety Administration (NNSA) last year as an independent agency under the State Council to monitor the safety of the country's nuclear power plants and act as the licensing authority to all civil nuclear installations.

Mr Jiang was appointed as director of NNSA.

But critics have pointed out that Mr Jiang would face a conflict of interest because he still retained his position as head of the Science and Technology Commission at the NIM.

Mr Ma yesterday explained that the commission was a consultative body comprised of elderly and semi-retired scientists and did not have an executive function.

But he admitted the dual role of Mr Jiang was not satisfactory.

"Personally, I think this is inappropriate," he said.

He disclosed that the issue was discussed in a meeting on Thursday between the visiting Legislative Council delegation and the Vice Minister of NIM, Mr Zhou Ping.

Mr Ma said that when China decided to establish the NNSA it had to find

somebody who was not only experienced in the nuclear field but well respected in the industry, because the NNSA was the body to regulate the whole industry.

Mr Jiang was picked because he had both qualities and China could not find someone else more suitable, said Mr Ma.

"He is now devoted to the work at the NNSA but he will also retain his role as head of the Science and Technology Commission at the NIM," said Mr Ma.

Mr Ma revealed that almost half of the nuclear experts now working at the NNSA under Mr Jiang originally worked for the NIM.

Mr Ma yesterday accompanied the Legco delegation to the Nuclear Research Institute of Beijing.

The Legco delegation met representatives of the NNSA in the afternoon for more than two hours.

A leader of the Legco delegates, Miss Maria Tam, said later she fully believed that the Chinese would ensure the NNSA would be independent from the NIM.

"Those working at the NNSA come from many dif-

ferent government departments and organisations and not all are from the NIM," she said.

"The Chinese told us that there will be independence of the NNSA because it is a state policy and it has been laid down in the law.

"I don't have any reason to doubt their sincerity," she added.

Another leader of the Legco delegates, Mr Allen Lee, said the Nuclear Research Institute could be compared with the Tokai Institute in Japan which he had visited last month but the Chinese institute still had "some ways to go."

"To me, though, it is a bit of a surprise that China has an institute at this level.

"The set-up itself in some ways is impressive but it still has some ways to go. The Japanese institute has much more advanced equipment," said Mr Lee.

Mr Stephen Cheong, another member of the delegation, added: "What we see today gives us some confidence that nuclear industry in China is developing."

He said he was happy to learn that some of the experts working at the institute would be transferred to work on the Daya Bay plant.

More on Nuclear Safety Meeting

Hong Kong HONGKONG STANDARD in English 20 Sep 86 p 1

[Article by Andy Ho]

[Text]

MEMBERS of the Legco delegation in Beijing gave a vote of confidence to both Chinese nuclear technology and its safety inspectorate system after meeting officials of the National Nuclear Safety Administration yesterday.

Mr Zhang Yuman, Vice-Director of the NNSA, yesterday had a two-hour discussion with the councillors on Chinese nuclear safety regulations, licensing of nuclear power stations, monitoring system and the training of technical staff.

Miss Maria Tam, who heads the Legco team, said the Chinese have said repeatedly that the Chinese State Council has already granted full independent status to its nuclear safety inspectorate arm — the NNSA.

She said the Legco delegates have no reason to believe that the Chinese will not

try their utmost to enforce the nuclear safety guidelines.

"There will be independent inspectorate bodies in both the future Guangdong Daya Bay and another Chinese nuclear power station.

"Though neither of the two are now under operation, the elites involved in the

projects are not just drawn from the Ministry of Nuclear Industry and these people are strictly speaking not under the direction of the ministry," Miss Tam said.

She added that the Legco members have also seen a draft copy of the future Chinese nuclear regulations, and they are convinced that China will stick to the principles of the safety measures.

Another member Stephen Cheong said the experts responsible for the nuclear

programmes are not just young but aggressive.

"Among the some 130 technical staff members, many have foreign training. I believe my colleagues will have no doubts about the qualifications of the Chinese nuclear work force," he said.

The councillors also have no qualms about the dual role of Vice-Premier Li Peng, who oversees both the nuclear safety monitoring authority, the NFA, and the nuclear programme executive body, the Ministry of Nuclear Industry.

Another team member, Dr Richard Lai, who has been critical of the Daya Bay investment, said his doubts on the project have been reduced because of the present visit.

But he will still report public anxieties in Hongkong over the plant to the top Chinese officials. He will take the issue to Vice-Premier Li Peng in a one-hour session today.

Mr Ji Peng-fel, Director of the Hongkong and Macau Affairs Office, will host a farewell banquet for the 11 Legco delegates tonight. The Legco members will take an early flight to return to Hongkong tomorrow.

Meanwhile, a UK embassy source said the managing director of Britain's General Electric Co, Mr R. Davidson, will arrive in Beijing tomorrow for the contract-signing ceremony for the HK\$27 billion Daya Bay deal which is scheduled for September 23.

GEC is a major contractor for the conventional turbine of the power station.

Team Leader Reviews Visit

Hong Kong SOUTH CHINA MORNING POST in English 22 Sep 86 pp 1, 2

[Article by Frank Choi]

[Text]

HONGKONG councillors will continue discussions with China Light and Power Company in a bid to ensure that Hongkong will have cheaper electricity from nuclear power than from coal or oil-fired energy.

And China, in estimating future power charges from Daya Bay after the guaranteed period expires, is expected to adopt Hongkong's policy for public utility charges - operation costs plus a reasonable profit margin.

The Hongkong Nuclear Investment Company's contract for Daya Bay guarantees that electricity for the first six years of operation will be cheaper than coal-fired or oil-generated energy.

This message was brought back yesterday by the 11-member Unofficial Members of the Executive and Legislative Councils overseas fact-finding delegation which returned after a five-day visit to Beijing.

Mr Allen Lee said Umelco would try to get more details of the contract from CLP, although members understood

it was a binding commercial contract which could not be re-opened for negotiation.

He said Chinese Vice-Premier Mr Li Peng had told the delegation that although China was sympathetic to Hongkong people's concerns, once commercial contracts were signed no promises should be made outside the terms of the contracts.

"Although the price in 13 years from now (seven years for construction of the plant together with the guaranteed first six years) was too remote for consideration of future tariffs, various indications have shown that the price of electricity from nuclear power should be cheaper than coal or oil generated energy," he said.

Mr Lee described the Beijing visit as "very useful and fruitful". Members discussed their fact-finding observations with Chinese officials and visited nuclear research institutes to meet scientists and engineers working in nuclear energy.

Said Mr Lee: "We were impressed by their breadth and depth of knowledge, and close contacts with their counterparts in France, US, Japan, West Germany and other countries.

"We noted their long working experience in the nuclear field in China, and we were also pleased to learn of their extensive knowledge gained through those international contacts.

"Similar to all countries we visited, their approach to nuclear power places safety and quality as top priority. We felt assured that they will make every effort to ensure the safety of Daya Bay plant is in accordance with the highest international standards."

Mr Lee said Mr Li and other relevant Chinese authorities indicated that they fully recognised and understood Hongkong people's worries over Daya Bay.

He said Chinese officials had not taken the Daya Bay project lightly, and since 1979 many Chinese experts and leaders had travelled extensively to take a close look at nuclear plants all over the world, and were deeply aware of the need for the highest safety standards.

On the delegation's other tasks in convincing Chinese leaders to adopt their observations, Mr Lee said they had received favourable and positive responses:

● Mr Li gave his support in principle for the setting up

of an independent advisory body, with Hongkong participation, on safety and management aspects of Daya Bay, but added that the terms of reference and other operational details had yet to be worked out.

● Chinese leaders gave assurances on HKNIC's management participation at all levels throughout the lifespan of the plant.

● There was a clear delineation in responsibilities between the Government ministries and agencies for management and regulatory control of nuclear power plants.

The National Nuclear Safety Administration operated as an independent regulatory body, with the necessary authority prescribed through legislation.

It aimed to ensure the safe and quality construction and operation of nuclear power plants strictly in accordance with the laid-down safety regulations.

● Details of a comprehensive and well co-ordinated emergency plan would be drawn up in the next two or three years in accordance with the International Atomic Energy Agency standards and the specific needs of the areas in the vicinity of the plant.

● On design and construction of the plant, the delegation was assured that the site was not linked to any underground water source.

Members were told that a hydrogen-recombiner system and a system achieving the same objective of the pressurised containment penetration design used in the Zion plant in the United States had been incorporated in Daya Bay, while any future system that would provide greater safety would be looked at.

The French had yet to submit detailed data on a proposed new sand filter safety system to the Joint Venture Company, but the Chinese stressed that the financing for this item was already in the budget and the final decision would be based solely on engineering grounds.

● In response to Umelco's proposal for cross-border arrangements to exchange information and co-ordination of contingency planning, Chinese authorities told the delegation that arrangements had been made between the Guangdong environmental protection authorities and Hongkong Royal Observatory for the monitoring of radiation.

More Details on Visit

Hong Kong HONGKONG STANDARD in English 27 Sep 86 p 1

[Article by Esme Lau]

[Text]

CHINESE Vice Premier Li Peng has played down the widespread concern in Hongkong over the Daya Bay nuclear power plant by saying an opinion poll showing heavy opposition to the facility was not a formal survey.

Dr Richard Lee, said the Legislative Council delegation to Beijing over the week-end told Mr Li that Hongkong

residents are worried about the plant, which will be built 80 kilometres north-east of Hongkong island.

The contracts are expected to be signed tomorrow (see report on this page).

Mr Li said such opinions were not taken by a formal survey.

But he stressed every day he reads the news and he understands well the feelings of the Hongkong people.

A newspaper survey of 8,000 people made public

this month showed that 73 percent of those polled opposed the plan.

The results were nearly the same as an earlier news paper poll.

One million Hongkong residents have also signed petitions asking that the plant be shelved.

Dr. Lai, who has advocated the construction of the plant be halted pending further study, returned from the trip to Beijing feeling that, since the construction contracts were about to be signed, people should be prepared to live with the plant.

"Hongkong people should consider whether it is still useful to still object to the construction of the plant," he said at an airport press conference following their three-day visit to China. It included a 70 minute meeting with Mr. Li, who oversees China's nuclear industry, a tour of China's Nuclear Research Institute and meetings with top-level nuclear scientists and engineers.

Delegation leader Allen Lee read a statement calling the trip "useful and fruitful," and added the councillors were impressed that China's National Nuclear Safety Administration made "safety and quality" a top priority.

During Saturday's meeting with the Vice Premier, the Chinese refused to extend the guarantee of power prices from Daya Bay beyond the first six years of the plant, scheduled to come into operation in 1993.

Mr Lee said he was not worried by that refusal.

"The Chinese believe that by then the price of electricity will eventually be reduced to a level lower than the conventional means of power generation," he said.

The Legco member added that the guarantee ended after six years of operation because the agreement was already reached and the Chinese

did not feel like making any alterations at the present stage.

"I personally accept this explanation and I believe nuclear energy will be cheaper than coal-generated electricity by then," Mr Lee predicted.

The other group leader, Mrs. Maria Tam, added that the price estimate derived from reports and forecast of China's financial experts.

Mr Lee said the members were impressed with the breadth and depth of nuclear knowledge and close contact of Chinese with counterparts in France, West Germany, Japan and the United States.

But he added that details of a comprehensive emergency plan will be ready in the next two to three years.

Vice Premier Li also assured the delegation that the plant site will not be linked with any underground water source.

No final decision was made on the implementation of a sand filter system, a suggested safety measure, but the Chinese explained it was included in the budget and the decision would only be based on engineering grounds.

The Chinese had also suggested that arrangements could be made between Guangdong and Hongkong on the exchange of information and coordination of contingency planning.

A cross-border agreement had been made with Guangdong Environmental Protection Authority and Hongkong Royal Observatory for monitoring radiation from the Daya Bay plant.

Mr Li also told the Legco visitors that he supported the principle of local participation in the independent advisory body on safety and management aspects of the plant.

Debate To Continue

Hong Kong SOUTH CHINA MORNING POST in English 27 Sep 86 p 1

[Article by Wong Wing-Hang]

[Text]

THE Legislative Council debate on Daya Bay will be held after all. Councillors yesterday agreed unanimously to a motion calling for more information from the Government on the nuclear project.

The decision, which represents concessions from both sides, is seen as a bid to improve the public image of the council, affected by acrimonious debate over the power plant.

It is the first time since the Chernobyl incident that all the Unofficial members have taken a uniform stand on the issue.

The unanimous move is regarded as a concession by those members who opposed a special Legco meeting to debate the Daya Bay issue during the summer recess.

The debate will be held when the motion is put forward at the October 15 Legco sitting, an in-house meeting agreed yesterday.

The wording of the motion has to be finalised, but a draft version says:

"This council requires the Government to provide to this council details of the arrangements regarding the safety and tariff for the purchase of electricity from the Daya Bay nuclear plant and to provide supporting documents without breaching commercial confidentiality and to explain whether or not such arrangements are in the overall interest of Hongkong people."

Mr Martin Lee originally proposed a strong worded motion calling for "all the supporting documents" to be presented by the Government.

Some members opposed it on the grounds it might breach the commercial confidentiality of the China Light and Power Company and the motion was modified accordingly.

The anti-nuclear members, who feared their insistence on such wording would foil their chance of having a debate, finally agreed to the change.

It is understood that public pressure played a part in bringing around other members who were earlier opposed to a debate. They are anxious to show they are as responsive to public opinion as their anti-nuclear counterparts.

The interest of the senior member, Miss Lydia Dunn, in preserving the image of Legco and avoiding public confrontation between members also contributed towards them reaching this stand.

Miss Dunn stressed the importance of consensus at a briefing after the in-house meeting.

She said nuclear power generation was an issue of world debate after the Chernobyl incident and Hongkong was no different.

Although Legco members might hold different views over Daya Bay, they had the same aim in trying to allay the anxiety of Hongkong people, she said.

"We firmly believe Legco can best serve the public on the basis of consensus."

"We may not always be able to agree on every single issue, we are after all 46 individuals from different backgrounds, but we will not let honest difference in opinion undermine our respect for each other and our unity," Miss Dunn said.

She added that no member had objected to the idea of holding a debate on the Daya Bay issue.

"It was only a matter of timing since most members felt a special meeting during the recess was not needed," she said.

They were now taking the first opportunity after Legco reopened to debate the issue, she added.

A debate will not be possible at the first Legco sitting on October 8 since the Governor, Sir Edward Youde, will deliver his annual policy speech that day. The alternative is the second sitting on October 15.

The motion to be put forward that day indicates the compromise that has been reached.

During yesterday's in-house meeting, the members also discussed whether they should apply the Power and Privilege Ordinance to acquire the related documents from the Government.

Miss Dunn said it was too early to say and there were no uniform views among members.

She said some members thought the more information the Government provided to the public the better, while others feared the breach of commercial confidentiality might affect the confidence of investors.

The members were also briefed on the visit to Beijing by the overseas fact-finding delegation on nuclear power.

A detailed report by the delegation will be ready in a week's time.

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HONG KONG

REPORTAGE ON SIGNING OF DAYA BAY CONTRACTS

Contracts Signed 23 Sep

Hong Kong SOUTH CHINA MORNING POST in English 24 Sep 86 pp 1, 2

[Article by Albert Chan]

[Text]

THE controversial \$28.8 billion Daya Bay nuclear project was officially launched yesterday with the signing of all the key contracts – but British and French contractors, the joint venture company and financiers settled several major disputes about finance arrangements only hours before the ceremony.

The various parties involved, including the Bank of China, the foreign banks and the Guangdong Nuclear Power Joint Venture Company (GNPJVC), were still split on several outstanding issues as late as Monday night.

It was only at the last minute – literally a few hours before signing was due yesterday, that the negotiating obstacles were cleared.

"This is quite normal in negotiations – those involved will not move until the very last minute," said Mr Peter Tse, GNPJVC's deputy financial manager.

It was also revealed yesterday that negotiations for the project almost broke down late last year because of a disagreement over the exchange rates that apply for the Europe-based contractors.

Billed as the biggest joint venture in China since the country opened its doors in 1978, it took some six years of tough negotiations for the two French companies, Framatome and Electricite de France (EdF), and Britain's General Electric Company to strike deals with China.

It was disclosed yesterday that the joint venture company set up to build and own the plant will pay 6.3 billion French francs to Framatome for the 900 megawatt reactors, 1.3 billion francs to EdF for overall engineering servicing and £250 million to GEC for turbine generators.

Apart from these three contracts, the other main agreements signed yesterday involved loans from British and French banks to finance the project.

Mr Tse disclosed that late last year, as the joint venture company was about to sign memorandums of understanding with the equipment suppliers, the company insisted that the OECD rate at the time, 9.5 per cent, would drop by the time contracts were signed.

The joint venture company asked that the rate be adjusted when contracts were signed, to a lower level if the rate fell, or remain at 9.5 per cent if it rose.

The British and French contractors refused to accept

this and the negotiations almost broke down.

The British and the French subsequently agreed to the Chinese demand.

For the loan arrangements, Banque Nationale de Paris will lead six other French banks in a loan of 13 billion francs to finance the 6.2 billion franc reactors and nuclear fuel as well as the engineering, servicing contract that is worth 1.3 billion francs. Interest payments will account for the balance.

The Midland Bank of Britain will head 10 British banks in arranging a loan of US\$420 million for financing the £250 million British generators.

The loans in fact are borrowed by the Bank of China on behalf of the GNPJVC and the Bank of China will act as a guarantor.

The interest rate has been fixed at 7.4 per cent for the whole repayment period, which is 15 years from the start of commercial operation of the plant.

There have been many estimates on the eventual cost of the whole project but with the signing of the key contracts yesterday, the closest estimate now is US\$3.7 billion.

Broken down, the overall cost of building the plant will be US\$1.5 billion, but the two GNPJVC partners - China Light and Power Company and its Chinese counterparts - have already come up with US\$0.4 billion in equity, which means the GNPJVC now only has to borrow US\$3.1 billion.

Of this US\$3.1 billion, another US\$0.6 billion is added as a "standby credit" to cover possible currency fluctuations and other cost overruns during construction.

Thus, the GNPJVC will borrow a total of US\$3.7 billion from the foreign banks via the Bank of China.

The loans from the British and French banks add up to about HK\$19 billion, but the total cost of the plant will be about \$28.8 billion.

The balance is for other work on the project including civil work, site formation, erection of equipment and so on.

Following the signing ceremony yesterday, the GNPJVC will now submit the contracts to the Chinese State Council for final endorsement, which is expected to be virtually a formality.

The endorsement has to come before October 7. The GNPJVC will then issue a document known as an "authorisation to proceed" to each of the three main contractors, Framatome, EDF and GEC.

The letters of intent signed in March this year and taking effect in April stated that if this authorisation to start work does not come on or before October 7, the deal is off and fresh negotiations must be started.

After this authorisation, the three contracts will go full steam ahead with their construction.

The contracts stipulate that the two suppliers, Framatome and GEC, with co-ordination and supervision by EDF, must complete construction of the first reactor 72 months after October 7, that is by October 1992.

The second reactor should be finalised nine months after that, in July 1993.

On-site preparatory work in fact began as early as April 1984 and excavation for the reactors on August 18 this year.

Before the signing ceremony, Chinese Premier Mr Zhao Ziyang invited the top officials of the contractors, banks and the GNPJVC for a brief meeting at Zhongnanhai at the heart of Beijing where all top Chinese leaders work and stay.

"It was mainly a chat," said Sir Sidney Gordon, vice-chairman of China Light and Power.

Taking part in the signing ceremony were Chinese Vice-Premier Mr Li Peng, GNPJVC general manager Mr Zan Yunlong, Framatome president Mr Jean-Claude Levy, EDF general manager Mr Jean Guilhaumon, GEC managing director Mr Robert Davidson, BNP president Mr Rene Thomas, Bank of China president Mr Wang Deyan, as well as several dozen senior officials of China, the various companies and banks.

The British Ambassador to Beijing, Sir Richard Evans, and top French diplomats also witnessed it.

Mr Leny, in a short press briefing after the ceremony, refuted rumours that Framatome had given the GNPJVC a substantial discount in the deal.

He said the 6.3 billion francs price tag was not very different from a similar export contract in South Korea.

The difference in price was between one and five per cent, he said.

But Mr Leny did admit Framatome is getting a "very tight profit margin" in the deal.

The Framatome contract includes the supply of nuclear fuel, but the GNPJVC has not decided where to buy the uranium from.

EdF officials also spoke to the press after the ceremony.

The signing ceremony yesterday was colourful and disorderly, involving a virtual game of musical chairs.

As a total of seven contracts were signed and each contract often involved different parties and different numbers of people, much time was spent removing and adding chairs.

The name plates on the signing table also had to be changed.

In the program Chinese officials distributed to the media, there was a mistaken reference to Framatome's subsidiary, Fragma, taking part in the signing ceremony.

Actually, it was Framatome that signed on the subsidiary's behalf. Fragma will be manufacturing or supplying nuclear fuel under the contract.

Councillors Seek Details

Hong Kong SUNDAY STANDARD in English 28 Sep 86 p 1

[Article by Andy Ho]

[Text]

ANTI-NUCLEAR Legislative Councillors have threatened to exercise their right to force the release of confidential details about the Daya Bay nuclear project.

Councillor Szeto Wah said yesterday he and some colleagues will consider using the Powers and Privileges Ordinance to obtain secret financial data on the project, if the Government fails to give them the information they want.

"We as Legco members are duty bound to find out all information which is of public interest," he said.

In an in-house meeting on Friday, the unofficial members agreed to table a motion at the October 15 Legco meeting requesting the Government to "provide details of the arrangements regarding safety and tariff for the purchase of electricity from the Daya Bay nuclear power plant."

They also call for clarification of whether the arrangements will "sufficiently safeguard the long term interests of Hongkong people."

But Mr Martin Lee's original motion demanding disclosure of "all the supporting documents" has been watered down. The final motion now only asks for "such supporting documents as do not breach commercial confidentiality."

Mr Szeto said he will try to exercise the law to find out whether China Light and Power Company will make undue profits from the Daya Bay project.

A controversial confidential document is the Lazard Brothers report commissioned by the Government on the financial viability of the HK\$ 28.8 billion Daya Bay investment.

The Guangdong Nuclear Power Joint Venture Company has agreed to supply nuclear-generated electricity to the CLP at a price not higher than that produced from a local coal-fired station for the first six years of operation. But Mr Szeto said he wants to know the CLP's arrangement beyond the guaranteed period.

Meanwhile, Mr Anthony Ha, a spokesman of the 116-group Joint Conference for the Shelving of the Daya Bay Nuclear Power Plant, yesterday extended his coalition's support for the councillors' move.

Response from China Light, Power

Hong Kong SOUTH CHINA MORNING POST in English 29 Sep 86 p 3

[Article by Wong Wing-Hang]

[Text]

CHINA Light and Power Company Limited is willing to co-operate and provide information required by Legislative Councillors on its participation in the Daya Bay nuclear plant.

Mr Steven Poon, director of the Hongkong Nuclear Investment Company Limited, a subsidiary set up by CLP to take part in the Daya Bay project, said yesterday that the company would do its best to satisfy Legco members' demands.

"I believe their request is a reasonable one and we will provide information they have asked for," he said.

However, the company will still hold back some sensitive information which is considered essential to commercial confidentiality.

Mr Poon said CLP was a public company listed on the stock market, and it was not appropriate for it to reveal its profit before reporting to its shareholders.

"We have nothing to hide and we are glad to co-operate with the Legco members."

"Besides some information of this kind, the rest can be made available to the Legco members through the Government," he said.

The Legco members agreed unanimously last week to put forward a motion at the October 15 sitting calling on the Government to provide more information about the safety and tariff arrangements of the purchase of electricity from the Daya Bay plant.

But the motion has carefully excluded demanding information which may breach

commercial confidentiality.

Mr Poon said that the public would be protected from an unreasonably high level of profit by the HKNIC, although it was not covered by the Government's scheme of control as the CLP was.

The scheme of control provides that CLP can reach a certain level of profit in relation to its capital investment.

There were fears that if the Daya Bay plant was counted as part of the CLP assets, the power company might raise its profit level tremendously.

Persuade

Mr Poon said it was not possible for the Government to extend the scheme of control to cover the HKNIC.

"HKNIC is a company formed with its China coun-

terpart to build a power station in China. Because its assets are in China, it is outside the jurisdiction of the Hong Kong Government and therefore it cannot be, technically, a company under the scheme of control in Hong Kong.

"But having said that Hong Kong Government has realised this and also has realised the responsibility of the Government in making sure that the investors of HKNIC do not obtain profits more than what we call the reasonable profit, which is largely spelt out in the scheme of control in Hong Kong," Mr Poon said.

Meanwhile, CLP is gearing up its public relation efforts to try and persuade Hongkong people to accept the Daya Bay project.

Its public affairs unit will be split into two sections by the end of this year, one handling CLP affairs and the other HKNIC activities.

Mr Poon said an extensive range of public education programs had already been planned to start before the end of the year.

The programs include the production of a variety of

brochures and leaflets, films and videos, audio-visual programs and exhibitions.

"In addition, regular briefings and press tours to Shenzhen and Daya Bay will be conducted and an extensive schedule of briefings to district boards and other community groups will be carried out," he added.

The programs would not be one-off activities, but would be spread over the construction period of the project and continue throughout the plant's operation life, he said.

● Hongkong would be given early notification if any accident occurred at the Daya Bay nuclear power plant under an international convention which China has just entered.

The message was brought back by the Principal Assistant Secretary for Economic Services, Mrs Emmeline Mok, who returned yesterday from a special meeting in Vienna of the International Atomic Energy Agency.

The meeting adopted two agreements calling for early notification of nuclear power station accidents and emergency assistance for such accidents.

Importance of Plant to Hong Kong

Hong Kong HONGKONG STANDARD in English 23 Sep 86 p 6

[Editorial Report]

CHINA today puts the final seal on the Daya Bay nuclear power project. Here, where a million protest signatures would have seen to it that the final contracts never got endorsed.

But this is not to be. Hongkong people have made their position clear. It has to be, as everyone has known all along. China has the final say. The plant is to be built on Chinese soil and the Chinese have to take into consideration their sovereign right. They are also supremely confident of their ability to run the facility and the expertise, both foreign and local, at their disposal.

The Chinese are not callous. They have repeatedly said they will heed Hongkong views. They understand our fears. In confirmation of this they have put far greater emphasis than previously on the safety aspects of the plant.

More, they have agreed that Hongkong people should sit on an independent advisory body to monitor safety and management. If all works out well Hongkong should be alerted moments after anything goes wrong, no matter how minor the

incident. These are no small points for Hongkong.

We would hope that nothing goes wrong ever. But it is for China to spare no expenses whatever to ensure this. Only then can all of us be assured that Daya Bay, only 50 kms from us, will not jeopardise the continued stability and prosperity of the territory.

This is paramount, not only to Hong Kong, but to China as well. Hong Kong's interests are China's interests, hence that agreement to allow the British to continue managing the territory for another 50 years after 1997.

Which, of course, makes safety only one of the two major concerns of Hongkong people as far as Daya Bay is concerned. The other is the economics of the project.

A prime reason for Hong Kong participation in the project is the assurance of enough power at reasonable costs to fuel the progress we expect in coming years.

The capital outlay for a nuclear plant is astronomical. Some US\$20 billion in the case of Daya Bay. The temptation to recover costs quickly at consumer expense can be irresistible. Here, the 1979 Commission's attempt to secure a price ceiling, and the Chinese authorities' one price beyond the first six years of operation.

This guarantee has not by means many. The Chinese have put forward valid reasons. Much of the world's oil is now known, so is the rate of consumption. Inevitably, as these reserves are depleted, nuclear energy will become more attractive. Besides, China has ample resources of oil and are averse to all of them.

Fair enough but we should bear in mind that Daya Bay has just today 10 years

to come, any further thought of increasing our own energy production capacity. So there should be periodic reminders that our continued progress hinges

on power at economic cost. A contingency plan for power conservation in the event of an accident at Daya Bay on an unacceptable price hike in later years is worthy consideration at this point.

For the moment, as pens are poised to sign on the dotted line, the picture is not entirely bleak. While the bulk of the energy from Daya Bay will come to Hong Kong in the initial years, a great deal of it will go towards powering the development of southern China.

A prosperous southern China will obviously benefit us. The glaring economic gap between Hong Kong and its immediate neighbourhood to the north is not healthy. The continuing flow of illegal immigrants is one side effect of this gap we can do without. There are many other side-effects, too many to enumerate here.

Ultimately, a wealthier neighbourhood to the north will make Hong Kong's return to the Chinese fold that much easier, smoother, less painful.

Hong Kong has a big role to play in the modernisation of the mainland. Daya Bay can be looked on as a major contribution, no matter what fears we continue to harbour long after today's ceremony in Beijing.

These fears must be put aside. Not because they are without basis. No, because the project is far beyond our control. China has made its decision and we must live with it.

We must repose our trust in the Chinese nuclear experts and our own people who will be sitting on the advisory committee or monitoring the atmosphere on a day-to-day basis at the Royal Observatory.

And we must choose our people wisely for these tasks. Human beings are fragile, their behaviour erratic, and prone to mistakes. Human error has been responsible for many of the nuclear plant accidents, including Chernobyl. We would need people of much sterner stuff for the very tedious job of monitoring Daya Bay.

HONG KONG

LEGISLATIVE COUNCIL REPORT ON DAYA BAY 'CONTRADICTION'

Hong Kong SOUTH CHINA MORNING POST in English 14 Sep 86 p 11

[Article by W. H. Wong]

[Text]

THE report on nuclear plants by the Legislative Council's overseas fact-finding delegations has been criticised as biased and contradictory.

The charge came yesterday from the pressure group Meeting Point, which fears the report will be accepted by the Chinese Government as representing the views of the whole council on the contentious Daya Bay issue.

And the group has backed calls for a public debate by the Legislative Council so that individual councillors can make known their stand on the nuclear issue.

Meeting Point spokesman Mr Chan Mo-pow told a press conference yesterday the delegations failed in their mission to gather the facts.

"Most of the material in the report is one-sided in supporting the use of nuclear energy," he said.

"This only leads us to doubt the neutrality of the delegations."

The report, published two weeks ago, accepted pro-nuclear views unconditionally, but treated anti-nuclear views with distrust, Mr Chan added.

Referring to a referendum in Austria, the report said the construction of a nuclear plant was voted down by a "slight margin" of 50.1 per cent to 49.9 per cent, he said.

He added the report quoted an official who said the result was affected by "political" reasons.

The report also down-played a referendum on the Three Mile Island nuclear accident in the United States, in which 70 per cent of the votes were against the plant, he said.

Mr Chan said it was "regrettable" that the countries visited by the delegations, with the exception of Austria, were all supporters of nuclear energy.

"They were only forced to visit Vien-

na, because the International Atomic Energy Agency headquarters is there," he said.

He questioned why the delegation did not visit anti-nuclear countries, such as Sweden.

Mr Chan said the report left many questions unanswered.

These included why a petition that received more than one million signatures was ignored by the authorities, the impact on Hongkong's prosperity should there be a radiation leak, and the lack of any contingency plan in the event of an accident at Daya Bay.

However, he said his group felt the most basic and important question left unanswered involved the economic aspect of the project.

"The report leaves us puzzled as to why Hongkong needs a nuclear plant," Mr Chan said.

● Seven submissions on the Legco report have been received by the council so far.

A spokesman for the Office of Unofficial Members of the Executive and Legislative Councils (Umelco) said five of the submissions were from individuals and two from organisations.

Although yesterday was the deadline for submissions, the spokeswoman said more are probably still in the mail.

For example, the Joint Conference for the Shelving of the Daya Bay Nuclear Plant has notified the office it will be making a submission, which has not been received yet, she said.

Members of the public were asked to submit their views on the report, which was prepared by two groups of Legco members who visited nuclear power plants in the United States, Europe and Japan.

The councillors said they would collate these views and present them to the Chinese Government.

HONG KONG

DAYA BAY OPPONENTS REPORTED TO LOSE HEART

Hong Kong SOUTH CHINA MORNING POST in English 17 Sep 86 p 3

[Article by Wong Wing-Hang]

[Text]

HONGKONG people are losing heart in the struggle to have the Daya Bay nuclear plant shelved.

This is indicated in the findings of a survey which began on Monday last week and ended at noon yesterday, according to the survey convenors, a group of Legislative Council members.

Among the 8,862 valid responses, 73.08 per cent objected to the construction of the plant, compared with a similar response of 73.38 per cent during a July poll.

However, the proportion of people supporting the project had increased from the July figure of 10.48 per cent to 13.21 in the latest survey.

At the same time, the number of people calling for the shelving of the project had dropped from 16.14 to 13.71 per cent.

The July survey was conducted by the same group.

One of the convenors of the survey, Dr Richard Lai, said the major aim of the latest survey was to find out whether Hongkong people had changed their thinking on the Daya Bay issue.

He said the public's attitude might have changed in the past two months since a lot had happened including the publication of the Harwell Report, the Legco delegations' overseas visits and reports, and the Governor's visit to China.

"The increase of about

three per cent in the number of people supporting the Daya Bay project might mean many people have lost heart in the struggle to have the plant shelved," Dr Lai said.

As they thought it was already impossible to hold up the project, they turned to supporting it with the hope that all safety precautions would be installed.

Dr Lai said at present it was not possible to say whether those voicing support for the project were those who, in the July survey, had asked for it to be shelved.

And until this was ascertained the real reason for the change of attitude would not be known.

"But the general thinking now is that there is no use in opposing the project," Dr Lai said.

Another point, he added, was that many people in the latest survey did not fill in their names and identities on the questionnaires.

As a result, more than 2,000 responses, which made up almost 20 per cent of all the returned questionnaires, were invalid.

Dr Lai said despite assurances of strict confidentiality in handling the questionnaires, there were still fears among respondents that their participation in the survey might be used against them some day.

The findings of the survey were released in a hurry, Dr Lai said, to let the public

know the results before the Legco delegation set off for Beijing today.

Being a member of the delegation did not contradict his anti-Daya Bay stand, he believed.

"I will at least have the opportunity to reflect the worries of Hongkong people directly to Chinese leaders. The situation might be worse if I refused to join the delegation," he said.

However, the findings of the survey would not be included on the agenda of the talks between Legco members and Chinese officials.

Dr Lai explained that the team was invited to Beijing as members of the overseas fact-finding delegations and their discussions should therefore be confined to matters arising from the trips.

It would be inappropriate for him to present the survey findings in such circumstances, Dr Lai said.

But he added that he would make use of informal occasions to relay the findings to Chinese leaders.

"There will be ample opportunities such as before and after meetings, or during the dinners, when I can tell the Chinese leaders what Hongkong people think, according to the survey," he said.

Concerning the position paper of the Legco delegation, Dr Lai said the final draft had not yet been worked out.

The Legco members would hold a meeting tonight when they arrived in Beijing to finalise it.

However, Dr Lai said, it had been agreed that the worries of Hongkong people would be given a high priority in the position paper.

● The overseas edition of the *People's Daily* reported yesterday that the date for signing the three major contracts for the Daya Bay project had tentatively been set for next Tuesday.

The newspaper, the official Beijing mouthpiece, quoted the chairman of the Guangdong Nuclear Power Joint Venture Company, Mr Wang Quanguo, as saying that the negotiation and preparation for the project had already taken seven years and China could not wait any longer.

● More than 2,000 people are expected to attend a protest rally next month against the building of the Daya Bay plant.

Organisers said yesterday posters and pamphlets were being printed and 10 guest speakers would address the rally in Morse Park, Kowloon, on October 5.

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CSO: 5150/0027

HONG KONG

DAYA BAY DISCUSSED AT BROADCAST PUBLIC FORUM

Hong Kong HONGKONG STANDARD in English 29 Sep 86 p 4

[Text]

THE 107-member strong Joint Conference for the Shelving of the Daya Bay Plant was asked to change its name yesterday.

"Joint Conference for a Safe Daya Bay Plant" is the name suggested by Kowloon City District Board member Mr Kong Pak-keung, who argued that it would be now pointless to continue striving to shelve the project after the signing of major contracts.

Mr Kong was speaking at a public forum organised by

RTHK yesterday at Victoria Park.

The spokesman of the Joint Conference, Mr Anthony Ha, replied that they will stick to the title and objective of the coalition. This was because Chinese officials have stated that if the plant did not meet all the safety requirements, its construction would not proceed.

Another speaker, Legislative Councillor Mr Cheng Hon-kwan, expressed satisfaction over the Chinese acceptance of the opinions of the Legco fact-finding mission during their

recent visit to meet the Beijing authorities.

During the programme which was broadcast live on one of the Chinese channels, a highly-charged audience raised all sorts of critical questions which were mingled with disrespectful remarks like "Shut up you pseudo-nuclear experts."

Among the more than 150 participants who packed the audience stand, some of them were members of the anti-nuke coalition while some were District Board members.

Chairman of the Organising Committee of the Nuclear Technology Exhibition, Dr Raymond Ho, emphasised that nuclear education was long-term work. A permanent nuclear exhibition hall is needed for this purpose, he said.

Meanwhile, a China nuclear scientist who came here to lecture at the exhibition, said his country could help train local talent to acquire expertise in nuclear engineering so as to facilitate Hongkong's monitoring of the Daya Bay nuclear plant upon its completion in early 1990s.

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CSO: 5150/0030

CANADA

SOVIETS ASK ONTARIO HYDRO ABOUT NUCLEAR PLANT SAFETY

Toronto THE GLOBE AND MAIL in English 10 Oct 86 p A3

[Article by Stanley Oziewicz and L. Ray Silver]

[Text]

Soviet science and technology officials have asked Ontario Hydro to prepare proposals on the safe operation of nuclear plants, a step that could lead to sales of "house-keeping" services and technology.

The request came during a recent week-long visit to Moscow by a four-man Hydro delegation whose members were invited to discuss nuclear services in the wake of the Chernobyl plant disaster.

"We've been asked to prepare proposals in a number of areas, all related to the safe operation of their nuclear power plants," said Thomas Drolet, business area manager of Hydro's New Business Ventures division, set up 2½ years ago to spin off Hydro expertise and products.

"We are considering all of these areas right now. In some of them, we think there are prospects of honestly helping them on a humanitarian basis — of course, with cost recovery — and other areas that are straight, good commercial-looking ventures.

"My impression is that when the Chernobyl incident occurred, they sat down and said, 'Holy smokes, we've got ourselves a problem and, yes, we'll deal with Chernobyl principally ourselves.' But for the longer term they said it might be prudent to elicit some help from offshore."

Mr. Drolet said the meetings with Soviet officials were arranged through commercial business channels and were not a Government-to-Government affair. He said the invitation was extended by a Soviet import-export company.

He was reluctant to give details of how Ontario Hydro could collaborate with the Soviets, saying he believes nuclear officials from two Western European countries are also interested in making sales to the Soviet Union.

"I don't want them to know what we're doing."

However, he did indicate that the Soviets might be interested in air-cooled radiation-resistant clothing developed by Hydro and manufactured under licence by two Toronto-area firms.

The suits of heavy grade polypropylene protect nuclear workers from radiation given off by tritium, a triple hydrogen atom formed in the heavy water moderator-coolant of Hydro's reactors. The plastic suits completely enclose the wearer, are air-conditioned and come with a respirator and mobile phone.

Mr. Drolet said the Soviets seem interested because of the need to protect construction workers tunnelling under the Chernobyl-4 reactor. Preparing the base for entombment of the disabled reactor, tunnel crews have encountered high radiation, temperature and humidity conditions.

The Soviets are also interested in methods of training nuclear operators and discussing the fast-shutdown capability of nuclear plants. The design of Chernobyl made it difficult to shut down when its core became unstable.

Canada and the Soviet Union are signatories of the nuclear non-proliferation treaty. However, a bilateral

agreement between the two countries is necessary before Canadians can sell any nuclear products or expertise involving proliferation of nuclear material.

Without a bilateral agreement, according to Mr. Drolet, the only way to do nuclear-related business is by ministerial permit.

"It's my feeling, knowing the types of items we're talking about — good housekeeping at nuclear plants — there is no connection with nuclear proliferation concerns.

"Since a bilateral agreement doesn't exist, we must be able to convince the federal authorities that this business can go ahead by ministerial permit or it won't go ahead."

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CSO: 5120/1

BULGARIA

OFFICIALS DESCRIBE SAFE OPERATION OF KOZLODUY NUCLEAR PLANT

Sofia RABOTNICHESKO DELO in Bulgarian 13, 14, 15 Aug 86

[Serialized interviews with Chief Director Eng Georgi Dichev and other officials, identified in text, of First Atomic Power Plant at Kozloduy, apparently occasioned by the Chernobyl nuclear accident, by Iliya Slavchev, special correspondent of RABOTNICHESKO DELO, and Iliya Borisov, Vratsa correspondent of RABOTNICHESKO DELO: "Kozloduy '86--Attention! Zone of Elevated Responsibility"]

[13 Aug 86 p 4]

[Text] 1. Immutable Law

The office of the chief director of the Atomic Energy Combine at Kozloduy is a little strange. At least it seemed so to us. Whether he had given orders that it be arranged this way we didn't ask him, but truly his workplace does not resemble standard ones even though it is furnished in the standard way. All the same, the office "furniture," arranged in a different way, makes a different impression. Even the numerous telephones on his desk stand in a somewhat different way.

Our conversation with Eng Georgi Dichev began banally about him and we should have lost him as an informant had we not asked him what was wrong with the new power-generating unit No. 5; would it not reveal some surprises? He came alive at once.

[Answer] Power-generating unit No. 5 is indeed something completely new for us. Such a unit is under construction for the first time outside the bounds of the Soviet Union. But there are no surprises to talk about.

[Question] We mean its startup in regular operation.

[Answer] Prestartup tests have entered the final stage and we figure on bringing the unit on stream by the end of the year. That will take maximum efforts, of course.

[Question] But won't that be done at the expense of quality?

Without realizing it, with this question of ours we had put our finger on the very problem that our informant regarded as basic.

[Answer] Remember (he said to us), in building an atomic power plant and in operating, repairing and maintaining it, quality is an immutable law. Moreover, we are not talking here about good or bad quality, about high or excellent, world-class or other quality. Here there can be only one quality--the quality built in the design and the technology.

Thus our conversation turned towards the questions that interested us--the stability, reliability and safety in the operation of our First Atomic Power Plant (we had not yet got used to its new name). In the following days we met and talked also with other officials, specialists and workers of the plant. But it was only proper to begin with Eng Georgi Dichev, not only because he is the chief director and boss of this large-scale power complex, but also because he is one of our universally recognized nuclear-power specialists. He is one of the two Bulgarian engineers in this profession to first graduate in Moscow exactly 20 years ago. He came to Kozloduy at the very start of construction, was chief of the engineering division, deputy chief engineer and chief engineer, and now is chief director. He has been awarded the title of Hero of Socialist Labor. We asked him what his estimation was of the plant's stability of operation from its commissioning up till now and whether there had been moments when the atomic reactors had deviated from safe operation. He smiled.

[Answer] A legitimate question.

[Question] Which we would like you to answer as an impartial specialist insofar as possible.

[Answer] The very fact that for 12 years this question wasn't asked shows that it didn't bother anybody. Nor were there any reasons. Even the earthquake in Vrancea in 1977 aroused no uneasiness or doubts. It was very severe, as you remember, and a number of our conurbations along the Danube and in the Danube plain suffered from it, but the power plant--nothing. All its equipment, vessels and buildings withstood the earthquake quite uneventfully. The power units operated normally and we had no grounds or reasons for cutting back their capacity. This event showed that the plant's seismic security is much higher even than provided for in the plan.

[Question] But what is the security of the equipment itself?

[Answer] It, too, embodies very great reserves, a very great margin of strength. These reserves of reliability and security are present in the technology itself, too. For example, the specific load of [several words illegible] nuclear fuel is half that in the power plants of the Western countries. But what is most important is the fact that our reactors have a negative coefficient of reactivity. In more popular parlance this means that if for unforeseen circumstances the power of the reactor begins to increase, then it--the reactor--itself halts this process, i.e., it is self-regulating. The self-regulation concept has been introduced into nuclear-reactor physics and is of extreme importance for their safety.

One of the many important factors ensuring stable AETs [atomic power plant] operation (as the chief director explained to us) is the quality of maintenance of every kind--yearly scheduled, preventive, emergency, etc. Maintenance here differs radically from that in any other enterprise whatsoever. For example, the type and amount of maintenance work are determined and approved with the mandatory participation of representatives of the chief designer. This rules out the possibility of overlooking any maintenance, however insignificant it may be.

Not only the equipment but also the systems and parts included for maintenance are strictly monitored. A control check is made of the entire equipment, and that by two or three independent methods. With us it is the same as in aviation--as soon as an aircraft engine is [line illegible] it is replaced even though it may still be in excellent technical condition. It is that way with us too, for considerations of security and safety supersede all other considerations. Judge for yourselves--the entire technological process at the power plant is continuously tracked and monitored by three of the most modern, independent, i.e., self-contained, automatic systems. These rule out any subjective decision at variance with the requirements of the technological process. Let me add that in most atomic power plants in the West there are only two failsafe systems.

[Question] And still, Comrade Dichev, the conviction is ingrained in some people, even those with an engineering education, that harmful gases and polluted water are discharged by atomic power plants.

[Answer] Yes, there is such a conviction. It is due to the fact that very little has been written on these questions in our country. They are almost unexplained to the population. That is why phony opinions spread. Let me, as a specialist and an official, say most solemnly that our power plant discharges no polluted water at all. Why, we regularly go fishing and catch them in the wastewater canal from the power plant. And who knows better than we whether the water is polluted or not? Now for gases. As you have seen, the power plant has several high stacks. But they don't smoke; they are only vent pipes. The radioactive elements that escape via them into the atmosphere range from one-hundredth to one-thousandth of the established health safety norms. Of course, the people don't know this. Nor do they know that the natural background differs in different regions of the country. Around Vitosha, for example, it is higher. Our power plant raises the natural background 0.01. This increase is so insignificant that it cannot be determined with radiation-monitoring instruments and we prove it only with mathematical data, i.e., with theoretical calculations. If there were a thermoelectric power plant with the same capacity at this site, during a 24-hour period it would burn 12,000 tons of coal and pollute the air much more. Incidentally, this fact has been brought out and discussed repeatedly at international conferences. You would do well to talk about these also with Gecho Khitov, nuclear and radiation safety director.

Our conversation with Chief Director Engineer Dichev "delted" increasingly into many important and interesting questions. At least to us they were important and interesting, perhaps because we are accustomed to thinking, talking and

writing about them. And these are problems and questions of our times, of our day. We shall talk about some of them in the next article.

[14 Aug 86 p 3]

[Text] 2. A problem with Only One Solution

Our atomic power industry is still small, but already has its veterans. One of these is Gecho Khitov, a physicist. He is the first and the present head of radiation-monitoring research at Kozloduy Atomic Power Plant. His official position now is nuclear and radiation safety director.

"This is the office that was set up first at the power plant," Gecho Khitov told us. "There were 11 of us specialists who were appointed forthwith when the ground was first broken."

During the time the power plant was under construction, i.e., 1969-1973, the specialists measured the natural radiation background in the region. In the measurements, which have been made continuously since the commissioning of the power plant, 12 years by now, only once was an increase in the background recorded--the evening of the First of May 1986. The reasons for this are known--the accident at Chernobyl'. The experienced physicist sees that we have accepted the explanations with slight reservations. This obviously offended him and, assuming a serious mien, he said to us in an official tone. "I declare this most solemnly as head of the special radiation-monitoring research service. Precise and detailed documentation has been kept of all this and is at the disposal of Bulgarian and international inspection authorities."

[Question] Comrade Khitov, lately radiation background is being talked and written about with increasing frequency. This concept has become generally part of our language, but what precisely does it mean?

[Answer] Radiation background is the radioactive state of the environment--air, water, soil. When we say there is no change in the background, this must not be taken to mean that there is no radiation around us. If this happened, deformations would also occur in living organisms, for they cannot do without natural radiation.

Realizing that our knowledge on these questions was next to nil, the specialist physicist began to explain to us in the most everyday language possible that we speak of background changes when the radioactive particles in the environment are present in above-natural volumes. But even this still does not mean that any hazard has occurred. International norms have been established, the exceeding of which create conditions for a harmful effect on the health of humans.

[Answer] But I have already said that the measurements we have now made for 15 years have shown no deviations even of the natural background and that the first and only excess so far is that after the accident at Chernobyl'."

[Question] How did you, as a specialist, cope with it?

[Answer] Calmly, of course, for the elevated radioactivity was in a range that created no immediate threat.

Gecho Khitov fell silent and stopped to think, then glanced at us with a barely perceptible smile.

[Answer] I know somebody will say "Hey, give up on this Khitov. He's protecting his job. That's why he is talking this way." Okay, but what am I protecting--my colleagues and workers eating tomatoes and cucumbers from our greenhouses? Look at them there outside, beside the power plant. We eat cabbage and other vegetables from our garden, too. And they grow, so to speak, under the stacks of the power plant, beside the walls of the very reactors. You will find hardly anybody who will risk his life to protect his official position, however cushy it may be.

[Question] Yes, it is so. We agree, but let us remind you that just the same certain precautionary measures were taken at the beginning of May.

[Answer] And rightly (said Khitov and with wonderment asked), but what of it? When there are data about an epidemic of Hong-kong influenza, don't the health authorities and we citizens ourselves take appropriate precautionary measures? Why does this not embarrass us, but we are shocked by measures against an elevated background? We teach children how to observe traffic regulations, which is a good idea because it is necessary, but why should we not acquire elementary knowledge as well about radiation protection. This is normal and necessary; we simply live in such times.

In one way or another everybody we talked to during our stay at the atomic power plant spontaneously raised this question. The chief director Engineer Dichev, with concrete examples, even pointed out far more insignificant problems on which the broadest and most varied health education is being conducted, but nothing has been done to explain the basic rules of protection against radiation. Even we journalists have been admonished for writing nothing about these things. And we have been asked why.

Why, indeed? In order not to cause social stress? Well and good, but people need such information and when they do not receive it in the standard fashion, they make it up for themselves--and what's more, with the most incredible subject matter, from a pseudoscientific report to local gossip and scare-mongering rumor. It is precisely this that creates stresses among the population.

"And mankind has barely entered the era of atomic energy. It has yet to begin to develop it on a maximum scale," Eng. Oved Tadzher, hero of socialist labor, likewise said to us. It is hardly necessary to introduce him--he is our widely known builder, one of the apostles of Bulgarian atomic energy. He is now supervising the construction of power-generating units No. 5 and 6. Why, he was categorical--humanity has no other choice than to use the inexhaustible mighty power of the peaceful atom. The problem of energy, without which life is impossible, is a problem with only one solution--the peaceful atom.

Twenty-six countries now have atomic power plants with 370 reactors, whose capacity is more than 250,000 megawatts. In installed capacity these countries rank thus: the United States, the Soviet Union, France, FRG, Canada and the rest, but in terms of atomic energy's share of total produced electric power the rank order is as follows: France 65 percent, Belgium 50 pct, Finland 41.5 percent, Sweden 39 percent, Switzerland 35 percent, Bulgaria 32.3 percent, etc. As can be seen, France obtains almost two-thirds of its electric power through the atom.

Our country ranks 19th, having laid the foundations of its atomic power industry with the building of Kozloduy Atomic Power Plant. Its four reactors with a total capacity of 1760 megawatts annually pours into our national power system as many billion kilowatt-hours as our country produced in 1967 with all its capacities. It is anticipated that at the beginning of October the tireless peaceful atom will "hammer out" its jubilee 100-billionth kilowatt-hour.

The figure is impressive, but for all that we citizens who are uninitiated in the power industry cannot gauge whether it is a lot or a little. Therefore, dear readers, let us take a known fact and reason a little together. Our First Atomic Power Plant yields 32.2 percent of our total electric power production. This means almost one-third. Now let us imagine what the situation would be if 12 years ago we had not built and commissioned Kozloduy Atomic Power Plant. To prevent the progress of the country, of life at all, from coming to a standstill, we should have had to build at least one more power complex like Maritsa-Iztok. Building is not the problem; the problem is that there is no place, no resources. In our country there is no other coal field even of such low-calorie coal as in the East Maritsa Field. A way out could have been found even in the Maritsa if it had been at least half as deep as the Danube, or if we had had a little bit of Urengoy. But it is well known that nature has deprived us of both and yet the third. Therefore it was most realistic to become oriented towards atomic energy of the atom, as the party and state leadership of our country farsightedly did as early as 1968-1969 when the decision was made to build an atomic power industry.

Can we give up our First Atomic Power Plant? Nothing will be easier than that. The reactors will be shut down and come to a standstill forever; they will turn into useless rusty machinery. But let us try to imagine what this would mean. Most simply stated, every third day we would not have even one paltry kilowatt-hour; not even one bulb in the entire country would light up. Most simply stated, factories and plants would come to a halt; trains in stations and railroads, aircraft on airfields would come to a standstill; houses, villages and cities would be plunged into darkness. Every third day! It is frightful even to contemplate. . .

But let us return to our informants at Kozloduy Atomic Power Plant. Chief Director Engineer Dichev voiced a hypothesis--possibly in 50 years the scientific and technical revolution will find a different solution, for example, producing power in space and somehow delivering it to earth. Or something else. But in his opinion, in 50 years and maybe more the sole solution is atomic energy. And the physicist Khitov expressed his conviction in his own way.

[Answer] For many years (he said to us), I have been in charge of geophysical research in all of northeastern Bulgaria. We have looked for petroleum and gas. We have checked this land of ours centimeter by centimeter, so to speak, to a depth of 1000 and more meters. There is neither petroleum nor gas. Therefore I gave up this hopeless job and devoted myself to atomic energy. That is why we must study and adopt every achievement of scientific and technical progress relating to peaceful use of the atom.

[Question] Could anything very serious, Comrade Khitov, make you renounce, or drive you away from atomic energy?

[Answer] No, nothing! I am devoted to it with a profound awareness, understanding and conviction that I have devoted myself to a great cause, without which human progress will cease. My words will seem much like bombast and slogan-mongering, but I have no way of assuring you of my sincerity other than the fact that I have been here since the first ground-breaking and will remain as long as it is thought that I can work and be useful.

We encountered this conviction among all those we talked to. This is perhaps one of the distinguishing characteristics of the many thousands of staff employees, about whom we shall tell a little more in our next and final article.

[15 Aug 86 p 15]

[Text] 3. People Who Are on a First-Name Basis with the Atom

Actually, they are like all of us ordinary citizens and differ, perhaps, only in the special character of their occupation. They told us how an atomic power engineer is molded, especially out of operational personnel, i.e., the people who "talk" directly to the atom and make sure that it is always obedient. The overwhelming majority of workers at the power plant participated in its construction and assembly, which is the best method for detailed familiarization with the equipment and technology. Many of them have also been to the Soviet Union for training.

"With us it is a law," Chief Director Engineer Dichev explained, "that the reactors and nuclear technology are controlled only by specialists with a higher education. In the West in most cases these positions are filled by technicians who are secondary-school graduates. Moreover, in our case the system of personnel appointment and advancement is far stricter. No entry from the outside, through the back door, no connections or pulling strings.

"For every position here an examination is taken, and that according to a system quite different from the university system. Here one does not draw three from a specified approximately 20 questions, but takes an examination on the entire material, i.e., answers all 20 questions. And another important requirement set for any supervisory position in operational personnel--they must spend a certain probationary period in every workplace that is in the sphere of the supervisory activity in question. An interesting and effective form of continuing training is training exercises every month in which various emergency situations are acted out, including those which are in practice impossible.

We chatted with the party committee secretary of the power plant, Engr Nikolay Videnov. He gave us the following data. The Atomic Energy Combine employs over 3000 people in operations alone. Party members number 629 manual workers, specialists and office workers, of whom 509 have a higher education. Party membership cards are soon to be delivered to 20 newly admitted members.

"The work of our people has always been distinguished by high discipline, high conscientiousness and self-control," Engineer Videnov explained to us. "Some say that we have been a zone of elevated radiation. This is not true, of course. What is true is that we are a zone of elevated responsibility."

We asked whether there is an instance of a party group or primary party organization dealing with a violation of discipline of a party member or other member of the workforce.

[Answer] No, for the simple reason that there has been no occasion, (replied the party committee secretary). The very character of atomic power production requires two immutable things, absolutely mandatory for everybody: high professional training and high, conscientious discipline. I have also been employed in other enterprises, but I have been here from the start--for 7 years --in operational personnel, i.e., with reactors. I must tell you that in no other enterprise can the discipline be at all compared to the discipline at an atomic power plant.

We also heard a high rating of the personnel operating the reactors of the First Atomic Power Plant from Eng. I. A. Dmitriyev, head of the Soviet specialists in operations.

"During the time I have been at Kozloduy Atomic Power Plant, and it is not short--4 years," Igor' Afanasiyevich told us, "I am convinced that a very good, highly skilled workforce has grown up. The personnel running operations have an excellent knowledge of their job, they bear themselves with a strong sense of responsibility for their obligations. Among them there have been built up strong relationships of comrades and colleagues, which for a production process of this type is also important.

"Another fact likewise indicates the growth of Bulgarian power engineers. Many of them are also engaged in very serious scientific-research work.

"One of our workforces received an award from the national competition of RABOTNICHESKO DELO," the party committee secretary Engineer Videnov explained to us. "Another workforce of physicists, power engineers and engineers, headed by Engineer Dichev, had the daring to 'intrude' into the holy of holies of atomic fuel. The workforce is patenting a new method of loading and reloading the core. It is the best development in the world, highly efficient, and ensures great reliability.

We also heard very frequently from Bulgarian and from Soviet supervisors and specialists fine words about the workforce of First Atomic, by now transformed into a major atomic power complex. But even this good, close-knit and disciplined workforce has its problems. Its major concern for the present is the

impending commissioning of power-generating unit No. 5 with a capacity of 1000 megawatts. In the opinion of Eng. Georgi Stefanov, first deputy chief director responsible for the new capacities, preparation for the commissioning is proceeding normally, but staffing with operational personnel is lagging seriously behind.

"There is a special shortage," he emphasized, "of specialists in electronics and automation, in technological process-control systems."

The Soviet official, Eng. I. L. Sapir, viewed the problem with much more anxiety. "This is the most important problem," he repeated several times in our conversation. "We have told the management of the complex that if during the checkup of the knowledge of the personnel we are not convinced of their professional readiness to take over the power-generating unit, we will not sign any document for its delivery into operations."

Izrail' L'vovich explained that more serious still was the problem of repair service for the electronic instrumentation, which he called "an independent activity, and very complex at that." In the data computer center of power-generating unit No. 5 alone, 50,000 electronic units have been installed. At present it is not clear how this complex activity will be maintained, without which operation of the power plant is impossible.

Let us share also some of our personal impressions. The atomic power complex at Kozloduy can indeed, without any exaggeration, be called a zone of high responsibility. And still it must not be left to the special character of the work alone to "inculcate" a sense of responsibility and discipline. The personnel must be worked with constantly, specifically and intelligently. The accident at Chernobyl' teaches us that. For in the long run, whether the atom yields its mighty power peacefully and obediently depends on the people who "talk" to it every minute. But these people are not born ready-made atomic power engineers. They have to be taught, trained, educated. The result is that the personnel problem is not temporary, is not a problem for the commissioning of power-generating unit No. 5 alone. It must be solved from a 15- to 20-year perspective. But this is beyond the powers of the complex's management.

The personnel problem is also closely associated with the social development of the workforce. We must say quite frankly that for the people on whom the normal and reliable operation of the atomic power complex depends and who produce one-third of the country's electric power, there is a shortage of housing, of schools and children's establishments for their children. There is no health-care institution, no modern transportation connecting Kozloduy with the rest of the country. There are very many weak spots and deficiencies in the supply of provisions, in trade and services; little is done in the area of a mass sports program. Is it not a genuine paradox that when we refer to the atomic combine at Kozloduy, it is considered an extremely important enterprise on a national scale, but when we begin to talk about the social problems of the workforce, these are degraded to local significance. Yet it is more than clear that things will not be changed fundamentally with local resources, even of the entire okrug. It will be fair if all okrugs are obliged to shoulder their share, corresponding to the percentage of electric power they use. For everybody uses electricity--every enterprise, institution, school, hospital, every Bulgarian home--just as they use bread.

HUNGARY

THIRD PAKS NUCLEAR REACTOR TO PRODUCE ENERGY IN A MONTH

Budapest NEPSZAVA in Hungarian 28 Aug 86 pp 1, 4

[Article by Jozsef Hazafi: "Robot Installs Enriched Uranium; Physical Start at Paks Block 3; New Reactor Block Will Produce Energy in a Month"]

[Text] The physical start-up of the third block began yesterday at the Paks Nuclear Power Plant; the fuel elements are being loaded into the reactor.

We are standing here on the podium, an arm's length from the reactor. The robot, made by Ganz-MAVAG as prime contractor, has already begun installing the fuel of block number 3.

The reactor area is an area strictly sealed off from outsiders.

"Not because it is dangerous," explains our guide, department chief Istvan Andics, "because fresh fuel does not radiate. The ban is because we must create extraordinarily clean conditions when loading the fuel."

The Soviet and Hungarian experts working above on the reactor podium are in buttonless snow white gowns, no rings on their fingers or chains on their necks. Those who wear glasses have their glasses secured with a cord. Enormous damage could be done if foreign materials were to get into the reactor container. They would have to dismantle the equipment built in or loaded thus far and the work could not continue until they found the object--ring, pencil, screw driver--which dropped in.

One sees that the people working on the podium and guiding the loading are talking more than they are working.

"Every operation can begin only if the Soviet and Hungarian experts come to an agreement in every question. Then they log the beginning of the task, check that the fuel cassette goes into the proper place, and only then start talking about the next operation," Istvan Andics says.

We could also experience the circumspection on Tuesday when the government committee of the Paks Nuclear Power Plant met under the leadership of Laszlo Kopolyi. After the report by Jozsef Konya the committee reviewed the experiences thus far with the operation of reactors 1 and 2 and listened to Karoly Szivos, the director of EROTERV [Power Plant Designing Enterprise], who

reported on the preparations and planning for the construction of the two 1,000 megawatt reactor blocks. Following this there was a meeting of the start-up and control committee of the nuclear power plant. It reviewed the placing into operation of block number 3 and checked the issuing of the necessary permits and certificates. After the circumspect work the committee gave permission for the physical start-up of block number 3. Even then the committee set a few conditions, which were met Tuesday afternoon and night, then yesterday morning at 9:55 the final permission to load the fuel came from Budapest.

Only then could the robot loading the fuel begin work in the reactor hall. Forty two tons of moderately enriched uranium in a total of 312 fuel cassettes go into the reactor.

There is 4 meters of fuel in the six-sided cassettes, which are more than 6 meters long, but the enrichment is not the same in every cassette. So a special plan had to be worked out and fed into the robot as to which cassette went where. The equipment will be producing one month after the physical start-up.

"Very much is said today about safety. What will guarantee, here at Paks, that everything will go exactly right?

"In the first place the start-up and control committee checks every operation through the Power Inspectorate, as the supreme authority. In the second place, when we are done with the fuel loading, people from the International Atomic Energy Agency in Vienna will check us."

In the control room of block number 3 we could convince ourselves of how strict the restrictions are. The nuclear protection system operates from the first moment of the physical start-up.

Even though, as we wrote above, there is no nuclear radiation then.

Block supervisor Sandor Szucsán is already watching these instruments.

"The measuring systems are working as if the block were already producing power," he says.

An operational test is being made on the block computer and process control system developed and built by the Central Physics Research Institute, the Electric Power Industry Research Institute and the MMG Automatic Works.

"An agreed upon work program was completed a week ago. This represented an official test of the machine," says Sandor Molnár, operating chief of the computer.

"This is the first Hungarian made computer at Paks. How does the user feel about it?"

"Friday night we subjected the computer to a big security test. We produced a simulated breakdown and watched to see if even in this case it was capable of swiftly and precisely processing all the data, providing appropriate information to the operating personnel. We established, together with the Soviet experts, that the computer was suitable for service during the physical start-up."

Meanwhile in the reactor area the first fuel cassette has gone into place. The robot transferred the first cassette from the storage area into the resting basin and then from there placed the fuel into the reactor according to the proper coordinates. The work goes on 24 hours a day without interruption so that in 5-6 days the well adapted and practiced staff of the Paks Nuclear Power Plant can work on the next phase of the physical start-up.

8984

CSO: 5100/3053a

ARGENTINA

NUCLEAR SAFETY EXPERT SOUNDS ALERT, CITES EQUIPMENT OBSOLESCENCE

Buenos Aires SOMOS in Spanish 24 Sep 86 pp 4-10

[Article by Carmen Maria Ramos; reports provided by Carlos Revello (Cordoba) and Adriana Siero (United States)]

[Text] Could what happened in the Soviet Union happen here? An expert's report reveals some major weaknesses in the safety systems at the Atucha Nuclear Power Plant. The situation at Embalse, the dangers, and what officials have to say about this [are reported here].

The memory of Chernobyl is still too fresh for a report which uncovers safety defects in one of the nuclear plants operating in Argentina to be brushed aside. At the time of the Soviet nuclear accident last March, many people were beginning to ask if something similar could happen in Argentina's nuclear power plants.

An inhouse document--report no 94/86 of 26 March 1986--by the CALIN [Advisory Committee for Licensing Nuclear Facilities] which was leaked to the press in early September has revived these fears.

The report bears the signature of one of CALIN's members, Rodolfo Touzet, a veteran CNEA [National Atomic Energy Commission] expert, vice chairman of CALIN, and head of the department which oversees the application of safety regulations at both Atucha I and Embalse, the two nuclear power plants operating in Argentina. The author of the report sounds an alarm, warning that safety problems--in his view--may be going beyond the limits of what can be tolerated.

The Atucha Nuclear Power Plant first opened in 1974, so it has now completed 12 years of operation. Even though to date its safety record has been excellent, it is now considered a mature plant; this means it is approaching the midpoint of its usable life, estimated to be 30 years. Therefore, not only is it undergoing the natural wear and tear of its normal operation, but in addition, many aspects of its design have been rendered obsolete by technological advances. This means that if Atucha were built today, many of its

safety systems would be different and would incorporate new resources to make the plant more reliable, and to decrease risks to its workers, to the population, and to the environment in general.

The Report

The document prepared by Touzet--14 business-sized pages typed single space, plus five appendices containing lists of the sources consulted--is not an alarmist document. But reading it is, to say the least, disturbing. Over and over in the text, we find that the situations described have no solution unless indepth measures are taken. Among the most important problems cited are:

a. In many instances, the level of training of the staff operating the plant is less than what is required. Five years ago no training courses were given and as a result, many jobs related to the plant's safety and requiring formal licensing from CALIN are vacant. In particular, there is a lack of training in dealing with abnormal situations (read "accidents") and in maintenance (this means prevention). The latter, according to some sources consulted by SOMOS, could be related partly to the low salaries and to decisions not being made about assignments and promotions.

b. At the Atucha plant there is a chronic shortage of key parts which hinders preventive maintenance. The computer which monitors the plant's maintenance is an obsolete model, for which parts are no longer being made. Because of its age and natural wear and tear, it has become harder to keep it in full operation. This has already caused a number of incidents, which have led to its compulsory removal from service.

c. There have also been failures in the emergency electrical power systems, without which the plant could not be controlled in case of an accident. Part of this deterioration was caused by the fact that the plant has been pushed beyond the manufacturer's recommended limits.

d. The plant's operating license requires a quality control program ensuring that the technical characteristics of the plant's components are maintained constant from the time they first began to operate. The start of operation is authorized because the plant meets a series of requirements. If these requirements cease to be met, the plant should then cease to operate. This program has not been carried out at Atucha. As a result, there have been failures in control and instrumentation, which in other plants have led to some significant operational incidents in 1984 and 1985, causing overexposure to radiation or compulsory shutdowns. At Atucha I some work-related accidents have taken place which are related to this situation.

Is a Control Group Needed?

The DCN [Division of Nuclear Power Plants], which is directly responsible for Atucha I, has to date not complied with the requirement of setting up an independent control group with its own engineering capability (calculations, plans, procedures, tests, controls) to ensure that the plant's operation will be safe.

Something the report does not say is that a similar situation led to the accident of the RA-2 experimental reactor at the Constituyentes Atomic Center in 1983 in which its operator, Osvaldo Rogulich, died from overexposure to radiation. In that case there had been a certain relaxation of the safety requirements for the operation of an experimental reactor; this was found to be a factor among all the causes of the accident. The comment was made that if there had existed a control authority outside the CNEA, the situation might have been different.

Later the report lists a series of incidents—which could have led to accidents but which were prevented in time—in the following nuclear power plants: Tihange-1 (Belgium); Krsko (Yugoslavia); Borsele-2 (Holland); Loviisa-1 and 2 (Finland); Salem-1 and 2 (United States); and Tricastin (France). All of these incidents could happen at Atucha I under the present circumstances. The report emphasizes the need to bring the Atucha I plant up to date to prevent the occurrence of such episodes. The report backs up this need by enumerating and describing seven incidents which occurred between November 1984 and March 1986, five of which caused a forced shutdown of the plant. One included the breakage of fuel elements inside the reactor with a loss of uranium pellets. Another exposed repair personnel to high doses of radiation, and a third revealed that the emergency electrical systems were not working.

In a number of these cases serious procedural defects were revealed, such as making repairs without informing the control room personnel, or executing repairs without formal orders or the required supervision.

Although it should not be inferred from this that what happened in 1979 at Three Mile Island in the United States (at TMI a huge hydrogen bubble formed inside the plant, which fortunately did not explode) or the explosion at Chernobyl will necessarily happen at Atucha I, we have to learn from those experiences. In both cases, the accidents began with initiating events similar to those which have already occurred at Atucha I. They happened because safety regulations were overlooked through negligence, because the job had become routine, or through a lack of knowledge on the part of the operators.

The Nuclear Syndrome

One thing is clear: the world's awareness was heightened after the explosion of the Russian reactor, the first in the world to produce radiation victims. The West Europeans were strongly affected. The words of the Nobel Prizewinner in physics, Carlo Rubbia, did not greatly reassure the Italians about the potential dangers of nuclear energy--i.e., the possibility that a plant may explode and release huge amounts of radioactivity:

"al-Qadhafi, or crossing a street without paying attention are much more dangerous. The probabilities of sudden death from irradiation are less than 1 in 10 million," he declared. Even so, the Italians did not feel at ease.

"Among the questions being asked in the nuclear debate after Chernobyl, one of the foremost is the need to discuss the control of such activities by all of society," an expert in this field, the scientific journalist Julio Orione, told SOMOS. "This means that the republic's ability to decide what is beneficial for the community and what is not must be exercised fully. This takes place by means of an analysis of the economic and technical advantages of different systems of producing energy, and also through a study of the risks to health and the environment--and to survival."

According to Orione, in the case of the Atucha report, the CNEA should not have taken the position it did. "If the report exists and the risks of Atucha's operation are real, this should not have been concealed. Doing so only lends support to the notion that the nuclear field is a place filled with mysteries and dangers to which ordinary mortals only gain access when an accident happens. And then it is too late," he concluded.

The topic of safety--say the experts--is a technical-economic issue. It is a problem of relative cost. An absolutely safe plant would be economically unviable. What is at stake is obtaining a level of risk compatible with other risks accepted by society: automobile and plane accidents, industrial accidents such as Bhopal, natural disasters (earthquakes, lightning). The risk level accepted in the nuclear industry is much lower than in other industries, but even so it does exist. There are 350 reactors in the world--including old and new reactors and those now under construction--and thousands of accumulated reactor-years. Nuclear proponents argue that only one fatal accident has occurred (Chernobyl) and three serious but not fatal accidents: Three Mile Island and Brown's Ferry in the United States and Windscale in Great Britain.

What People at Atucha Say

"I will tell you only one thing: at this time the CNEA is analyzing the construction of the fourth nuclear plant. They have to decide whether it will be a pressurized reactor like Atucha, which is a German model, or if it will be a pressurized pipe design like Embalse, which is a Canadian model.

It seems to me to be quite a coincidence that just now a document which, by attacking Atucha, casts doubts on the German model, has been leaked to the press." This comment was made to SOMOS--with a request for anonymity--by a person responsible for operational safety at Atucha.

According to the engineer Alfredo Fernandez Franzini, manager of Atucha, the report by a CALIN member on the plant for which he is responsible is "a very respectable and even healthy point of view." But he does add one clarification: "The problem is that it was released to the press as if it were the court's verdict, and not an allegation by the prosecuting attorney. And to this charge, which I feel is filled with generalizations, I respond by saying that Atucha has all its safety systems operating up to date, as they were designed, and as they began to operate when the plant first opened. Today we continue to operate under those conditions."

He then cited a few examples.

a. About the personnel shortage, I can say that of the 61 jobs that are licensed at Atucha, I have covered 98 percent of them.

b. Nor is it true that the total accumulated experience of the staff has been reduced by half. When Atucha began to operate, as it was the only center we had, it had 300 percent of the people it needed. Afterwards, as new projects were undertaken, it began to transfer its people and its experience to them. Atucha was to some extent a school. So while at this time I have 150 percent of the people I need, I still have a surplus of 50 percent to operate the plant safely.

c. About the issue of parts, the chairman of the CNEA, engineer Alberto Constantini, revealed that he had requested from President Alfonsin a supplemental appropriation of \$3 million to purchase parts. Franzini said that "up to the present time, I have never lacked a part for the plant. Furthermore, a spare part makes the plant operational, but does not affect its safety. The problem would arise if we had no parts to repair safety systems. In that case what I would do is shut down the plant. If we wanted to have a scheduled shutdown now, which means stopping the plant and conducting a safety inspection, at this moment we do not have the necessary parts available. But they are on order, and the first parts will arrive in December. We have planned a scheduled shutdown for March 1987."

The Devil's Advocate

A red alert has been issued for Atucha. But the necessary question now is: what is going on at Embalse? The 600-megawatt plant began to operate in September 1984, and was halted for the first time in March of this year. The reason for this shutdown is that a pinhole had been found in one of the 3,500 pipes of one of the steam generators making up the reactor's cooling system.

This is a fully predictable equipment failure: between 45 and 50 percent of all reactors have one such problem each year.

The engineer Eduardo Diaz, manager of the Embalse Nuclear Power Plant, spoke with SOMOS about how its safety systems are working:

[Question] What happens if the plant's entire computer power fails, for that is the real heart of the central control of the facility?

[Answer] A second identical computer automatically goes into operation. It is constantly recording everything, even while it is inactive.

[Question] What if the electricity supply is cut off?

[Answer] The computers have systems which are independent of each other, and automatic generators which are independent of the plant.

[Question] Despite all this, what if both computers should fail to operate?

[Answer] In that case, the entire plant, including the nuclear reactor, would start to shut down gradually until stopping completely in what we call a secure position.

[Question] What if there is an earthquake?

[Answer] The building has an anti-seismic design and the reactor's containment facility was built of pure cement with walls 1.20 meters thick. Embalse is an area of light seismic activity. It would take a catastrophic earthquake to destroy the reactor building.

[Question] What if one of the electronic systems used to detect problems should fail?

[Answer] All the systems and all the sensors are redundant, and in some cases, they have triple redundancy.

[Question] How do you know that the redundant and triply redundant systems will operate properly when they are needed and will not be as useless as a punctured spare tire?

[Answer] Because we check them every day.

In addition, the chairman of the CNEA, engineer Alberto Costantini, joined in the stir created by the CALIN report, stating: "There is no danger presented by the safety conditions at Atucha I; the plant will not be shut down." Quite a few observers recalled that the CNEA has just won a long battle for its survival, after several years of budget cuts and political delays. Its major enemies in the radical government have fallen by the wayside: Bernardo

Grinspun, when he was at the ministry at the economy; Conrado Storani, when he was head of the department of energy; and German Lopez, former secretary general of the office of the presidency. At the same time, the lack of foresight and the nonfulfillment of their programs by other energy subsectors, combined with the water shortage in El Chocón and in Salto Grande, about 12 months ago made nuclear energy the lifesaver of the SIN (National Interconnected System). The two plants have been operating beyond their normal power at the SIN's request in order to prevent blackouts. This has been in part the cause of Atucha I's problems. But at the same time, it seems to have given the CNEA more leverage in the government, so that it has finally won authorization to build two more power plants in the future.

Elias Palacios, director of radiological protection and safety at the CNEA, told SOMOS: "If we were not convinced that we need nuclear energy and that the benefits we can derive from it outweigh the risks to which we are subjecting ourselves, we would never accept it." According to Palacios, its justification lies in the fact that if Argentina were to use all of its hydroelectric power available from now until the end of this century, that would provide just 0.6 kilowatt per inhabitant. But only beyond levels of 1 kilowatt is it estimated that countries can attain decent standards of living, while the developed countries consume 2, 3, and even up to 5 kilowatts per capita. "For the time being, we can only increase our energy generation by using nuclear power."

When all is said and done, could an accident happen in the Argentine nuclear power plants? Palacios responds: "Strictly speaking, the answer has to be yes; there are always risks involved in any activity; there are risks in travelling by plane or by car. In our case, we believe that every precaution has been taken, and that the probability of a catastrophic accident is really extremely remote."

Measuring the Environment

Does radioactivity threaten the life and ecological equilibrium of areas near nuclear power plants? Despite all the precautions and safety measures taken at each plant, there are extra backup methods used to check this. Among other duties, this is the job of the CNEA's radiological protection and safety service, whose labs are located at the Ezeiza Atomic Center. There, periodic samples are sent of elements from the environment: from rainwater, from fish in the area, from riverwater, from milk--a good way of measuring iodine in the environment is to analyze the thyroid gland of cows, since iodine concentrates in the thyroid, and cows graze over large areas of pastureland. Each of these samples is dried and converted into a compact pellet (like bouillon cubes), and is then compared with samples of similar elements taken from other parts of the nation. "The iodine content we see in milk from Buenos Aires is no different from what we see near

Embalse or Atucha," engineer Elias Palacios, director of the CNEA's radiological protection and safety service, told SOMOS. "It is more likely that we would detect radioactive material released by nuclear explosions in other parts of the planet than that we might find radioactivity released from our own plants."

BRAZIL

LEAK IN NUCLEAR PLANT COOLING SYSTEM REPORTED

Two Valves Involved

PY092048 Madrid EFE in Spanish 2010 GMT 9 Oct 86

[Text] Rio de Janeiro, 9 Oct (EFE) -- A water leak in two valves in the cooling system of the Angra I nuclear reactor is keeping the plant technicians on alert because of the possible risk of radioactive contamination. This was confirmed by Xamuset Bittencourt, executive director of the National Commission for Nuclear Energy (CNEN), who said the incident "entails no further risks for the safety of the personnel."

The leak, which began on 3 October but was not announced until today, was caused by the rupture of the security rings of the auxiliary circuit of the system. These rings are the same type used on the U.S. space shuttle Challenger which failed to work properly causing the disaster on 28 January. The rings are large specialized parts, which are used at the joints of the water, steam, gas, and oil pipes in the system. These rings are also used in conventional generating plants.

Bittencourt explained that the problem occurred during a preliminary test, and that "in a nuclear plant, it is a good thing it happened at this early stage, when greater danger can be prevented."

Furnas Centrais Electricas S.A., the company responsible for the plant, has ordered an evacuation of the sector. However, it is still not known how many workers were near the place when the incident happened.

Leakage Not Radioactive

PY092335 Brasilia Domestic Service in Portuguese 2200 GMT 9 Oct 86

[Text] Mines and Energy Minister Aureliano Chaves today said the problem that occurred on 7 October at the Angra I nuclear plant was minor. Chaves said a valve stop [retentor de valvula] suffered a short circuit, which did not affect the main system of the plant. Therefore, there was no danger of radioactive leakage. This is because the plant has not been operating since January.

Camilo Penna, president of Furnas company has distributed reports about the 7 October incident at Angra I. According to Camilo Penna, a valve of the reactor's cooling system was defective, causing a small water leakage in the drainage tank. The official message also explains that this type of leakage is possible in any industrial

installation. Moreover, it remains confined within closed systems, and thus does not represent any danger.

Angra dos Reis Mayor Jose Luis Ribeiro (Resequê) explained: There has not been any sort of radioactive leakage to endanger the environment at the Angra I plant. This fact has already been confirmed by the National Commission for Nuclear Energy (CNEN).

/9716

CSO: 5100/2014

BRAZIL

UNREPORTED NUCLEAR PLANT LEAK 'VIOLATES' TREATY

PY110146 Madrid EFE in Spanish 1815 GMT 10 Oct 86

[By Edgar Hernandez]

[Text] Rio de Janeiro, 10 Oct (EFE) -- The water leak in a valve of the refrigeration system at the Brazilian Nuclear Plant Angra 1 was not reported to the Argentine Government as it should have been under bilateral agreements that were signed recently. Experts said today that the Brazilian Government has thus ignored agreements in the nuclear sector, under which the two countries are required to exchange information in any case of accident at a nuclear plant. The Argentine Embassy in Brasilia has said it did not receive any official communique from the Brazilian Foreign Ministry.

Brazilian physicist Rogeiro Cerqueira said that Brazilian officials are trying to play down the accident, and pointed out that dismissing the importance of the accident reveals a lack of perception of its gravity.

Meanwhile, Jose Eduardo Leme Salvatore, Director of the Reactors Department of the National Atomic Energy Commission (CNEA), maintains that the leak was not an accident, but an "operational problem." Leme Salvatore explained that the leak occurred in the auxiliary cooling system, which is only slightly contaminated with radiation from the main system to which the auxiliary system is connected. Leme Salvatore stated that the water contamination level was very low, and that similar leaks have occurred 10 times since 1979, when the first tests were conducted.

The accident occurred on the night of 30 September, when valve 8073b failed, causing nearly 1,000 gallons of contaminated water to spill. The Angra 1 nuclear plant is located in the municipality of Angra dos Reis, 154 km from Rio de Janeiro. Its population of 71,000 people was alerted to the accident 9 days later, which elicited protests from politicians and ecologists throughout the country. Angra dos Reis's climate is one of tension because of disagreements between the plant scientists and other experts.

Nuclear Plant Chief Pedro Jose L... said that neither the nearby population nor the workers at the plant have been exposed to radiation dangers. In turn, the Attorney General of Rio de Janeiro State, Joao Batista Petersen Mendes, has sent a note to the officials of the Furnas Centrais Eletricas Company, requesting that information and an explanation of the leak be submitted within 10 days.

The Angra 1 Nuclear Plant has been shut down for 277 days for testing purposes. Yesterday, the Federal Appellate Court (TFR) authorized the resumption of plant operations, alleging that the shutdown is causing more than \$50 million in economic losses.

BRAZIL

NUCLEBRAS GETS FUNDS TO OPERATE UNTIL MARCH 1987

PY120233 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 9 Oct 86 p 38

[Text] NUCLEBRAS [Brazilian Nuclear Corporations] President Licinio Seabra said yesterday that with the 1.66 billion cruzados to be disbursed this week, the corporation will be able to operate until March 1987, meeting its commitments to pay foreign debt service, contractors and suppliers, and operation costs.

NUCLEBRAS now has overdue debts totaling 400 million cruzados, and practically all its activities have been discontinued. Seabra said that by March 1987 he expects to be able to work out the planning Secretariat (SEPLAN) and the Finance Ministry a multiyear budget for the Brazilian Nuclear Program. This multiyear budget, which President Sarney approved in August, will prevent critical situations like the one NUCLEBRAS now faces.

Under the new multiyear budget, all the projects related to the Brazilian Nuclear Program will be rescheduled. Construction of the Angra II nuclear plant is currently the only project that is under way, although at a rather slow pace. This project will have to be accelerated if the ELETROBRAS [Brazilian Electric Power Companies] Expansion Plan is to meet its target of bringing the Angra II nuclear plant into operation by mid-1992. The Angra III nuclear plant project is at a standstill, as are the uranium enrichment plant in Rezende, Rio de Janeiro, and the uranium concentrate (yellow cake) manufacturing plant in Pocos de Caldas, Minas Gerais.

/8309

CSO: 5100/2018

BRAZIL

NUCLEAR, MISSILE, SUBMARINE DEVELOPMENTS SURVEYED

Hamburg DER SPIEGEL in German 25 Aug 86 pp 107, 108

[Unattributed article: "We Make It Ourselves. Emerging Power Brazil Is Secretly Planning Powerful Items: Atomic Bomb, Nuclear-powered Submarines, Nuclear Missiles"]

[Text] Cattle breeder Dario Cardoso complained, saying: "I went into the primeval forest because I wanted some peace and quiet. Now I find out that I was never before so close to the noise of hell." For only 130 km from his farm in the south of the state Para the Brazilian military is allegedly planning the explosion of its own atomic bomb--such is the fear of Cardoso and many, including competent, Brazilians.

How far along emerging power Brazil is with building the bomb is at present the greatest secret. "Brazil preparing nuclear test site"--these vague headlines alone in the daily newspaper FOLHA DE SAO PAULO last week caused the generals to make vehement denials, led the president to hold an urgent meeting with his ministers, and caused numerous physicists to warn of Brazil's nuclear armament.

As a matter of fact, the Brazilian air force has had several tunnels built, including one that is 320 m deep and 1 m in diameter, at a base concealed deep in the forest near the Serra do Cachimbo (mountain range). Nuclear physicist Luiz Pinguelli Rosa of the National University in Rio de Janeiro says that "that is adequate for a nuclear test." Most underground tests in the United States in the 1950's and 1960's took place at a similar depth.

The military does not at all deny the fact that nuclear items are being planned. Admiral Jose Maria do Amaral Oliveira, chief of the armed forces, stated that "in the future, storage facilities for nuclear waste will be created there." Yet he did not reveal exactly how these tunnels, which are equipped with thermal insulation will be used.

For years there have been rumors among scientists about the construction of a Brazilian atomic bomb which is supposed to be ready for testing at the beginning of the 1990's. The country's civilian nuclear program can hardly make any contribution to this because of the strict international controls. The uranium enrichment plant which was acquired from Siemens subsidiary

Kraftwerk Union has so far not become operational. Brazilian physicists call it "nuclear scrap metal."

Since about 1981, the military has been operating a parallel nuclear program which is to result in military use of nuclear power. Like the Argentinians, who already control the fuel cycle and are about 5 years ahead in the nuclear race, the Brazilians are seeking to acquire the "critical technology" free of controls.

They are getting closer to achieving the uranium enrichment which is necessary for the bomb in two ways: In the nuclear research center of the University of Sao Paulo (Ipen), special centrifuges have been under development; and since 1978 in the air force's Technical Institute in Sao Jose dos Campos, 97 km northeast of Sao Paulo, scientists have been researching uranium enrichment with laser beams for years.

Even very pure natural uranium can produce the explosive material plutonium in a reactor—Ipen has a facility for this. In Ipen's experimental reactors, according to estimates, annually between a few grams and 5 kilograms of plutonium are released. Since 1983 Brazil has been working on developing natural uranium reactors.

The biggest problem with the natural uranium reactor is the heavy water which is used as a moderating agent and which is supposed to keep the nuclear reaction under control. However, physicists are of the opinion that the Sao Paulo electric works has already undertaken production within the framework of its hydrogen energy program.

Overall, the various military research projects do in fact constitute a parallel nuclear program on which probably 2,000 to 3,000 skilled people are working. Leonard Spector, American nuclear expert, said a year ago that "while Brazil is not in a position today to manufacture explosive material in large quantities, it is pressing toward achieving this capability in 5 years." At the end of 1983 General Pires Goncalves had been pleased, saying: "Soon Brazil will be able to produce the bomb."

But whether the new capability will then be exploited is a political decision. There is agreement on acquiring bomb production technology by about 1990. But then one group would like to stop, because having the capability of building the bomb acts as a deterrent.

Admiral Maximiliano da Fonseca, retired, would like to go one step further: "My personal opinion is that we should explode a bomb as a demonstration. But far more important than the bomb is the production of nuclear-powered submarines."

This reflects the shock of Argentina's defeat by England in the Falkland Islands war: Fonseca is still shuddering at the fact that "three English nuclear-powered submarines put the entire Argentinian fleet out of commission, it no longer ventured out of port."

Brazil's bomb research is also supplemented by a missile program which is being pursued in an equally purposeful manner. Brazil sold research missiles--also developed with the help of the FRG--to Iraq as a military version.

In line with the space program of the Centro Tecnológico da Aeronáutica in São José dos Campos, which is under the command of Air Force General Hugo de Oliveira Piva, a Brazilian satellite is to be put into orbit in 1990. Along with this, there is a second parallel program: an intermediate-range ballistic missile with solid fuel is under development. The daily newspaper O GLOBO was pleased at the beginning of this year: "In 5 years Brazil can have missiles with nuclear warheads."

Brazil's armament is even helped by a space treaty with the PRC. Both countries will be able to close technological gaps by agreed-upon cooperation. Brazil receives Chinese know-how about liquid rocket fuels which it needs for the civilian space program, and about guiding missiles which have civilian and military significance.

In return, China gets the solid fuel which was developed in Brazil. Piva says: "We had to make that ourselves since no one will sell anything like that."

12124/9435

CSO: 3420/59

BRAZIL

BRIEFS

ANGRA I NUCLEAR PLANT READY--Angra I Nuclear Plant Chief Pedro Figueiredo, 41, announced at noon yesterday nuclear fuel tests at Angra I have been completed and only authorization by the National Nuclear Energy Commission [CNEN] is necessary for the plant to resume operations. Leakage of radioactive water occurred at the Angra I nuclear plant on 30 September. The plant has been shut down since January of this year. During the tests the reactor operated at critical power (only 3 percent of its full power) and now that the tests have been completed the reactor has been turned off. However, it will be kept heated and ready to go into operation at any time. Once the CNEN authorization is received, Figueiredo noted, the plant could be supplying electricity within 2 days. [By Marcelo Beraba and Tales Faria] [Excerpt] [Sao Paulo FOLHA DE SAO PAULO in Portuguese 12 Oct 86 p 3] /8309

CSO: 5100/2020

3 November 1986

TRINIDAD AND TOBAGO

BRIEFS

NONPROLIFERATION TREATY SIGNING--The Government of Trinidad and Tobago has agreed to ratify the treaty on Non-proliferation of Nuclear Weapons and to sign a basic agreement between this country and the Inter-American Institute for Co-operation in Agriculture. The treaty, which was signed by Minister of External Affairs Errol Mahabir on behalf of the Government in August, aims at discouraging the spread of independent nuclear weapons to more countries. According to a release from the Ministry, the Government supported this treaty on the ground that "although Trinidad and Tobago has neither the ambition nor the necessity to develop a nuclear weapon capability, it cannot be indifferent to the dangers posed by the unchecked proliferation of efforts by other countries to develop that capability." [Excerpt] [Port-of-Spain TRINIDAD GUARDIAN in English 30 Sep 86 p 12] /9317

CSO: 5140/007

INDIA

AEC CHIEF DEFENDS NUCLEAR ENERGY PROGRAM

Bombay THE TIMES OF INDIA in English 11 Sep 86 p 9

[Text]

DR. Raja Ramanna, chairman of the atomic energy commission, today launched a tirade against critics of the country's nuclear power programme.

Inaugurating the regional centre for exploration and research of the atomic minerals division at Bangalore University, Dr. Ramanna came down heavily on "muckracking" newspaper reports and comments on the country's nuclear programme not only by some Indians but even by "unknown but mischievous professors from abroad who for some reason or the other got enormous publicity."

Defending the country's nuclear power programme, he said nuclear power was perhaps the cheapest and safest form of producing electricity. Also, they upset the environment the least when compared to hydro and thermal power.

That nuclear power was most promising was evident from the fact that 75 per cent of the total power generated in France was from this source.

In the circumstances, he said: "It amazes me to see that some people in Karnataka and elsewhere seem to be waiting for opportunities to decry the importance of nuclear power, especially when this particular state is suffering so much for want of electricity. Its neighbouring state is benefiting in a big way from nuclear power."

Giving details of the country's nuclear power programme, Dr. Ramanna said generation of power at the Tarapur reactor was as high as 85 per cent. He said the second unit of Rajasthan had been working continuously for about five months. The Madras units were also working satisfactorily though there had been breakdowns which had nothing to do with nuclear power as such.

Instead of appreciating the strides

made on the country's nuclear power front, he said, some people were bent on exaggerating "small trips and other minor breakdowns."

He said to publicise the difficulties of introducing nuclear power in this country was a great disservice to the nation.

Criticising of some of the investigative reports appearing in newspapers, Dr. Ramanna remarked: "How this investigation is done is not clear because I find many half truths and false information in these so-called investigative reports."

Reacting to the charge that the Dhruva reactor was a total failure, he pointed out that it was a research reactor for which new types of assemblies had to be designed and tested and the best configuration of fuel elements obtained. "Dhruva is the only one of its type in the world and certainly among the largest. Smaller reactors have taken three to four years to go to full power, but we expect full operation in a few months."

AMERICAN PROFESSOR

Referring to Prof. Gary Mithollen's comments on the country's heavy water programme, which appeared in today's newspapers, Dr. Ramanna, who was the architect of the country's first nuclear explosion at Pokhran in 1974, charged: "It seems that this American professor would want us to believe that we have secret dealings with every other country in the world to get heavy water except that which we are producing ourselves in quantities."

Dr. Ramanna said the heavy water plants at Baroda, Tuticorin and Kota were working successfully. Instead of reporting on the success of our own scientists, a small fire which occurred at Talsar was given undue publicity, he added. Repairs to this plant were almost complete and it would be operative next month.

INDIA

REVIEW OF 'YEAR OF TRIALS' FOR ATOMIC ENERGY DEPARTMENT

Bombay THE TIMES OF INDIA in English 16 Sep 86 p 8

[Article by K. C. Khanna]

[Text]

CHERNOBYL has shaken the world's nuclear scientists as nothing else since man first learnt to harness the atom to the tasks of development. In India, at least a third, if not a good half, of the scientific manpower engaged in R & D is working full-time for the department of atomic energy. It would have been abnormal if this huge community had remained immune to the fall-out of self-doubts from the Chernobyl disaster that assails its peers overseas. Indeed, its unease has been vastly compounded by three other factors that have of late hit the country's atomic energy programme: technical failures, persistent delays and that familiar bugbear — shortage of money.

Altogether 1986 has so far been a bad year for the DAE. After a fairly good run during 1985, the first unit of the Madras Atomic Power Station (MAPS) suffered a four-month outage till the beginning of August. Shortly afterwards a fuel rod assembly stuck in the transport system outside the reactor and the second unit of MAPS had to be shut down. The department is still baffled by the daunting problems posed by the stricken first unit of the Rajasthan Atomic Power Station (RAPS). Meanwhile, its two new nuclear power reactors abuilding at Narora have been further delayed by at least 15 months. Nor has its very first nuclear power station at Tarapur (TAPS) worked satisfactorily since 1977-78. In fact, the capacity of its two units was officially derated in April 1985, from 210 MW each to 160 MW, ironically shortly after the

constraint on securing adequate enriched uranium fuel for it was gone. France had replaced the United States as the supplier under a trilateral agreement a few months earlier.

In A Mess

That is not all. The DAE's programme for the production of heavy water is still in a mess. The plant at Talcher is virtually a dead loss. The performance of the Baroda and Tuticorin plants is said to have "significantly improved", but it is still nowhere near the designed or even the derated capacity. The effective capacity in Baroda will only be realised, on the DAE's own showing, during 1987-88. Whether the inventory of indigenous heavy water will suffice as and when the eight new units now under way are ready for commissioning thus remains a moot point.

The DAE's long-term plan for creating 10,000 MWs of capacity for the generation of nuclear power by 2004 A.D. critically depends on its ability to design and commission the first two of a series of 500 MW reactors by 1995. To be able to do so, it needs nearly Rs. 500 crores during the current plan for procurement of the requisite materials and advance action. Due to the shortage of resources, however, the Planning Commission has allocated only about Rs. 210 crores for the purpose and suggested that it can raise the balance by floating bonds in the capital market once it is turned into a commercial corporation. How precisely the time and cost overruns in the implementation of the various nuclear power projects will affect the

new corporation's financial viability is yet another question mark. As things are, there is not the slightest chance that it will be able to attain its targets and account for 10 per cent of the total electricity generation in the country early in the next century. Not too long ago, nuclear stations accounted for about three per cent of the aggregate capacity; today their share has slipped to just about two per cent.

To what extent the new concerns for safety will add to the costs of nuclear power is again uncertain. The Chernobyl disaster has led to a good deal of activity in the department but so far it has yielded little of substance. The Atomic Energy Commission (AEC) has appointed a task force to prepare a report and the Nuclear Power Board has set up a parallel committee to cover the same ground. A three-man delegation was sent to the "post-mortem session" convened by the International Atomic Energy Agency in Vienna recently.

Cheapest & Safest

But even before these experts had got into stride, Dr. Raja Ramanna, the chairman of the AEC, had insisted that "nuclear power is the cheapest and safest". And he specifically ruled out the possibility of a Chernobyl kind of accident in this country for three reasons. The Russian reactors are designed to use ordinary water as a coolant and graphite as a moderator. Apart from being highly inflammable by itself, hot graphite in contact with water breaks it into its two molecules — hydrogen and oxygen — and thus increases the fire hazard manifold. Indian reactors, in contrast, use heavy water as a moderator which acts as a "heat sink". Secondly, the new generation of Indian reactors (from Kalpakkam onwards) are all housed in a double containment — a room within a room. An accidental escape of radio-activity into the atmosphere is, therefore, almost impossible. Finally, Indian operators, unlike the overwhelming majority of operating personnel overseas, have a reverential attitude towards atomic energy; being trained scientists, they are more aware of the costs of negligence or human error.

The candid report by the Russian delegates in Vienna, by and large, bears out Dr. Ramanna's assessment. They have frankly acknowledged that the unique design

of the reactors is accident-prone. They have also admitted to at least six major and deliberate violations of the stipulated safety procedures at Chernobyl — something against which there cannot possibly be any defence. Nor is it a secret that the Indian nuclear power stations are much more automated than the Russian plants which need greater human intervention to run them. In India every shift is manned by at least five graduate engineers licensed for the job after elaborate training and tests. It is unclear whether the "foreman" in operational control of the Chernobyl plant at the time of the accident was equally well qualified.

Even so, Dr. Ramanna has said that additional safety measures will be taken once the lessons of Chernobyl are learnt. After the 3-Mile Island disaster, the DAE had installed an extra pump to take over in case the auxiliary boiler feed pump fails. Besides, instrumentation panels were changed to ensure that the operators have quicker and easier access to the relevant information in an emergency. In the newer plants (from Narora onwards) an emergency control room, independent of the operational control room, is being set up and it will be manned round the clock. All this will add about two paise per unit to the cost of nuclear power but the expense will be well worth it.

This apart, the problem of decommissioning its older and derelict plants stares the DAE in the face. In another decade or so, TAPS will have to be taken off the line, it has already been operating for nearly 17 years. An edge of urgency to the exercise has been further imparted by the possible fate of RAPS-I. Right from 1972, when it attained criticality, it has seldom been able to deliver full power; by March, 1982, it had suffered as many as 251 breakdowns. Some of the longest of these unscheduled outages were caused by repeated failure of the rotor blades of its imported turbo-generator, leakage of heavy water and labour trouble. On February 1, 1985, it was synchronised with the grid after a lapse of nearly three years that the DAE took to repair new leaks in its end-shield. Within four months, however, the leaks re-appeared elsewhere and since May 20, 1985, the plant has been out of commission once again.

Hard Choice

After so many attempts to rectify it, the DAE has concluded that the end-shield, if not the entire reactor, may have to be written off. The choice is hard. One option is to cut up the highly radio-active 120-tonne end-shield by remote control, remove the pieces, put them in cement concrete containers encased in stainless steel shielding and bury the lot. Another is to remove the fuel elements, pour cement concrete over the rest of the plant and entomb it forever. The third is to remove not only the fuel elements but also the other radioactive components and bury them. Any one of these three projects will cost up to Rs. 40 crores and four years to implement.

So the DAE is also toying with the idea of reducing the quantity of the light water that normally goes into

the end-shield and running the plant at lower power. But this course may lead to what is called differential heating and cooling and may be risky. If so, decommissioning may be the only viable alternative. Whichever way it is done, this will be expensive.

It is, however, plain that the additional costs of safety or decommissioning will affect the relative economics of nuclear power much less than design defects or failure of equipment. The two units of MAPS, for instance, can make a tidy profit even after selling power to the Tamil Nadu grid at 43 paise per unit while the generation cost of thermal stations of comparable vintage in the vicinity is much higher: 50 paise to 60 paise a unit. This cost advantage, however, will be severely eroded, if not altogether lost, in case MAPS, like RAPS, is bedevilled by frequent and prolonged outages.

/13104

CSO: 5150/0022

INDIA

HEAVY WATER PLANTS TO REACH FULL CAPACITY BY 1987

Calcutta THE STATESMAN in English 15 Sep 86 p 9

[Text]

BOMBAY, Sept. 11.—The Rs 100 crore twin heavy water plants set up at the Rashtriya Chemicals and Fertilizers factory at Thal, near here, is all set to produce the first batch of heavy water by the end of next month.

The plants will produce about 20 tons of heavy water by March 1988. They will reach full capacity of 110 tons by next year. This information was given by Mr Duldeep Singh, chairman and managing director of RCF. The heavy water plants have been set up on behalf of the Atomic Energy Commission.

Mr Singh announced that the RCF, at its annual meeting, had registered a net profit of Rs 22.23 crores and it had decided to pay a dividend of Rs 11.03 crores to the Centre. The dividend paid by RCF to the Government was about Rs 54 crores, he said.

During the financial year 1985-86, RCF achieved a record urea production, crossing the one million ton mark with production reaching 1.2 million tons. Almost all the increase in urea production during the year was contributed by RCF's Thal plants. Its nitrogen production accounted for 15% of the nitrogen production in the country. This achievement was possible due to the Thal super fertilizer project going into full commercial production from June 1985.

Mr Singh said that the Rs 800 crore Super Thal Fertilizer Project, completed in time and within approved cost, had set a new standard in project execution. Mr Singh listed more achievements of the RCF during the year.

/13104
CSO: 5150/0021

INDIA

NUCLEAR SCIENCE CENTER TO HAVE POWERFUL ACCELERATOR

Bombay THE TIMES OF INDIA in English 13 Sep 86 p 14

[Text] **T**HE newly-established Nuclear Science Centre here will soon be the site of a nuclear particle accelerator, one of the most powerful of its kind in the country.

Financed by the University Grants Commission, and costing about Rs. 75 million, it is to serve as an experimental facility for Indian universities.

The device, called the pelletron, and used to accelerate charged atomic particles to high speeds and study their interactions with other particles and matter, will be ready for use by early 1989, NSC officials say.

Besides helping scientists study nuclear physics, the device will facilitate research in such areas as medicine, material sciences and even archeological dating.

Inside the pelletron, the charged atomic particles, called ions, will be accelerated to high speeds by using an electric potential of 15 million volts making it the most powerful pelletron in the country.

An identical device but with an accelerating potential of 14 million volts, now being installed at the Tata Institute of Fundamental Research (TIFR) in Bombay, should be ready by the middle of next year, NSC officials say.

Both the NSC and the TIFR pelletrons were bought from an American company and will be brought in parts to India and assembled here.

But the steel tank that encloses the accelerator will be Indian and so will be the tanks for storing a gas to be used as an insulator.

There are other accelerators in the country, but none meant particularly for universities nor do they possess the power that the pelletron offers.

The centre as well as the accelerator will prove invaluable to experimental nuclear physicists in the country, a senior NSC official says.

The pelletron will be able to accelerate a variety of ions ranging from the light hydrogen to uranium-238 than hydrogen.

There are also plans to install another machine called a cyclotron as a booster accelerator at the base of the pelletron.

This device, in which particles travel in circles as they are accelerated, can yield even higher energies than the pelletron.

Through periodic zonal workshops, the NSC officials are already in discussion with physicists about the nature of experiments that may be conducted at the centre.

/13104

CSO: 5150/0020

NUCLEAR WASTE BURIAL GROUND NEARLY COMPLETE

Bombay THE TIMES OF INDIA in English 11 Sep 86 p 12

[Text] **INDIA'S** most expensive graveyard will be ready to receive its first coffin in a couple of months.

It took eight years and Rs. 200 crores to build the graveyard, a cavernous underground vault made of thick concrete lined with steel.

The unusual cemetery is the burial ground for deadly radioactive nuclear wastes that have accumulated since the country's first nuclear reactor "Apsara" went into operation in 1956.

The Bhabha Atomic Research Centre (BARC), which is very soon commissioning India's first nuclear cemetery, calls it "solid storage surveillance facility (SSSF)".

Located near the Tarapur Atomic Power Station (TAPS), the SSSF's deceptive superstructure hardly gives the impression that it is the repository of the deadliest wastes ever produced by man.

Inside its underground vault are rows and rows of steel tubes that will house the waste canisters dropped by overhead cranes. Heavy steel plugs seal the tubes' openings at the top.

Guarded day and night, the vault is cooled 24 hours a day in a drought of air to carry away the heat given off by the decaying nuclear wastes.

BARC says that SSSF is an interim storage facility that will be

under surveillance for 25 years.

After that the coffins will be retrieved and placed in a permanent burial ground — probably an abandoned mine of the Kolar gold fields where bore holes have been drilled and simulation studies are already going on.

Nuclear wastes cannot be dumped in the same way as municipal garbage because of the deadly radiation they emit for as long as 100,000 years.

Before dumping the wastes inside the SSSF vault, they must be "conditioned" so that the coffins do not leak.

The leak-proof coffins are made in multi-million rupee facilities called waste immobilisation plants, one of which has just become operational at Tarapur.

About 250,000 litres of highly active wastes, that have so far been embalmed into coffins, are awaiting burial.

According to BARC, the "conditioned" wastes take up very little space. The wastes from four of India's atomic power plants in one year can be packed inside two large steel almirahs.

The SSSF will only store long-lived and highly dangerous nuclear wastes. A lot more wastes remain in reinforced cement concrete trenches, dug up around nuclear facilities in Rajasthan, Tarapur, Trombay and Kalpakkam.

/13104

CSO: 5150/0018

IRAQ

IRAQI DELEGATE ADDRESSES IAEA CONFERENCE IN VIENNA

JN011437 Baghdad Voice of the Masses in Arabic 1300 GMT 1 Oct 86

[Text] Iraq has called on the IAEA general conference currently being held in Vienna to exert pressure on the Zionist entity to open up its nuclear installations to international inspection and to abandon nuclear weapons. In an address to the conference last night, Dr Rahim 'Abd al-Katal, head of the Iraqi delegation, explained that the Zionist entity continued to build its nuclear arsenal in the past year, either by transferring uranium or by stealing hundreds of electronic instruments used for nuclear explosions.

In his address, the head of the Iraqi delegation said that countries which have used and are still using pressure and threats by suspending their financial and technical contributions to the IAEA with the aim of affecting this conference and limiting its ability to adopt appropriate resolutions should instead put pressure to prevent the leak of materials and information which help the Zionist entity continue to build its nuclear weapons.

Dr Rahim 'Abd al-Katal explained that the IAEA general conference includes sovereign countries which must have equal rights and responsibilities. It should seek to fulfill the people's inalienable right to the peaceful use of nuclear energy.

/9599

CSO: 5100/4505

PAKISTAN

AEC CHIEF TALKS OF PLANS FOR 'A FEW' NUCLEAR PLANTS

Karachi DAWN in English 8 Sep 86 p 9

[Text]

LAHORE, Sept 7: Mr Munir Ahmed Khan, Chairman, Pakistan Atomic Energy Commission, has said that the country will set up "a few" nuclear power plants to bridge the gap between power requirements and availability.

For the time being, Pakistan would have to rely on imported plants but gradually it would be able to make them locally, he said in an interview with DAWN here on Sunday.

About the Chashma nuclear power plant, Mr Khan said the chances of Pakistan getting a reactor had brightened following the Prime Minister's recent visit to a number of Western countries. Negotiations were going on with a European country and an agreement would be signed in the near future, he indicated.

According to him, Pakistan would get the reactor without signing the Nuclear Non-proliferation Treaty (NPT) and that the said European country would accept Pakistan's point of view.

Pakistan, he insisted, would not sign the NPT unless India did the same. He said signing of the NPT would be like bartering away national sovereignty. Once Pakistan signed the treaty no other nation would offer protection.

Mr Munir Khan reiterated Pakistan's proposals to India, and said: "We are still waiting for an answer from them." Pakistan, it may be mentioned, has proposed to

India that the two countries agree not to make nuclear weapons, inspect each other's nuclear installations and make South Asia a nuclear-arms-free zone.

He said Pakistan could manufacture reactors locally but this required "huge investment and a heavy industrial base," which were not available. He cited the Indian example and said it could make its own reactors in 20 years after getting all drawings from Canada.

According to him, small reactors were more capital-intensive than the bigger ones. He said Pakistan would make research reactors without any foreign assistance but such reactors could not meet power requirements of the country.

If all resources were made available and everything went well, a reactor could be made in about six years, Mr Munir Ahmad said.

IMPORTANCE OF ENERGY: The PAEC Chairman also addressed the Pakistan Engineering Congress in the afternoon, and highlighted the importance of energy for the economic progress of a country. He gave details of the Chernobyl reactor accident and its implications for other countries in general and Pakistan in particular.

To resolve the energy crisis in the country, he stressed the need for making more efforts for oil and gas exploration solving technical problems hindering the use of domestic coal, developing hydroelectric resources and bringing in nuclear

technology to reduce pressure on oil and gas resources.

Mr Munir Ahmed explained how the Chernobyl accident took place and said a number of countries had refused to give up their nuclear programme even after the disastrous consequences of the Soviet plant mishap.

He said European countries would exploit the accident for their own interests and in addition to criticising the Soviet Union for lack of precautionary measures, would urge developing countries not to undertake nuclear programmes in order to escape such consequences. Pakistan, he said, would not yield to such "advice" and would continue to pursue its peaceful nuclear programme. He, however, said Pakistan had already adopted a number of precautionary measures obviating possibilities of any such accident in the country.

He said about half a dozen stations had been set up to monitor radioactivity in the country. The Chernobyl accident had slightly increased the radioactivity level in the country but it was well below the permissible limits.

/9274

CSO: 5100/4704

PAKISTAN

COMMENTARY VIEWS ACCORD WITH CHINA

Islamabad THE MUSLIM in English 20 Sep 86 p 4

[Text]

THE Sino-Pakistan accord on peaceful uses of nuclear energy is a significant step towards extending and diversifying their existing economic ties. While the two countries have been already pooling their experience in the broad field of science and technology, this is the first formal agreement enabling them to launch joint projects in harnessing nuclear energy for solving their manifold social and economic problems. The agreement specifically provides for mutual co-operation in using nuclear technology in industry, agriculture, exploration of nuclear minerals as well as medical research. Of immediate interest will be the possible production of radio isotopes in industry and application of radiation techniques to increase agricultural productivity.

One special dimension of the agreement is that it is perhaps the first serious attempt to promote such collaboration in this sensitive field between two Third World countries often denied access to sophisticated nuclear technology by the developed countries of the North who are anxious to preserve their own monopoly in this field. This accord should stimulate further efforts within the Third World to overcome their limitations in extending the frontiers of science and catching up with the developed world through more intensified South-South collaboration in this area. Pakistan has bitter experience of Western opposition to its legitimate efforts to implement its long-conceived Chashma nuclear project to solve its escalating energy crisis. Let us hope active Sino-Pakistan co-operation will re-launch this project in the not too distant future despite Western resistance and from resources and expertise generated within the Third World.

The monopolists of nuclear technology need not be alarmed by this accord between China and Pakistan because the arrangement is well within the safeguards stipulated by IAEA and specifically forbids either side to transfer nuclear material for military uses. Both sides have made a firm commitment to restrict their exchanges strictly for peaceful uses. Above all it is a move to reduce their dependence on the reluctant transfer of technology from the rich to the poor world.

/9274

CSO: 5100/4704

PAKISTAN

BRIEFS

SAFETY ARRANGEMENTS AT PLANT--Many measures have been taken to further increase the safety arrangements at the Karachi nuclear power plant. Some of the recommendations suggested by the nuclear safety committee after reviewing the present safety arrangements have been implemented. An IAEA team reviewing safety standards has also described safety arrangements at the Karachi nuclear power plant as satisfactory. [Text] [Karachi Domestic Service in Urdu 0200 GMT 13 Oct 86 BK] /12624

CSO: 5100/4705

SOUTH AFRICA

COUNTRY SAID SELF-SUFFICIENT IN NUCLEAR ENERGY

MB060712 Johannesburg Domestic Service in English 0500 GMT 6 Oct 86

[Text] The executive chairman of the Atomic Energy Corporation, Dr Weinand de Villiers, says South Africa is self-sufficient to a great extent in the field of nuclear energy and will most certainly be able to meet demands for nuclear fuel in the next 10 years. In a television interview, Dr de Villiers pointed out that South Africa, nevertheless, was like every other country dependent on other countries for progress in technical areas. In the field of nuclear energy development it would be more difficult and more expensive to be self-sufficient if South Africa did not have international cooperation.

Dr de Villiers said that South Africa was prepared to cooperate with other countries, especially Third World countries, to help them in the field of nuclear energy, but this would be subject to guarantees from the International Atomic Energy Agency [IAEA].

Dr de Villiers said that there was skepticism in many other countries about the South African uranium enrichment process despite the fact South Africa had continually reassured the world that its processes would only be used for peaceful means. Referring to the proposal at the congress of the International Atomic Energy Agency in Vienna last week that South Africa's rights and privileges be suspended, Dr de Villiers said that political pressure had been the main reason for the move. He pointed out that South Africa's rights and privileges could not be suspended under the statute of the IAEA, but that rules were often ignored when politics intervened. At the Vienna meeting it was decided that delegates would vote on the measure in September. [as heard]

/9365
CSO: 5100/3

SOUTH AFRICA

OFFICIAL EXAMINES NUCLEAR TECHNOLOGY PROSPECTS

MB070918 Johannesburg Television Service in Afrikaans 1800 GMT 5 Oct 86

[Interview with Dr Wynand de Villiers, executive chairman of the South African Atomic Energy Corporation, on the "Network" program by moderator Kolie van Koller -- live in studio]

[Excerpts] [Van Koller] Here in the studio we have the executive chairman of the South African Atomic Energy Corporation, Dr Wynand de Villiers. Doctor, good evening and welcome to Network.

[De Villiers] Recently politics has played a very important role in the International Atomic Energy Agency [IAEA], and South Africa encountered more problems.

[Van Koller] Why are we now at loggerheads with IAEA on industrial and strategic interests as far as our nuclear installations are concerned?

[De Villiers] We are not at loggerheads on the issue of industrial and strategic interests. It is through agreement with the IAEA that we are voluntarily abiding by guarantees on the enrichment process so that the world will know it is only used for peaceful ends.

[Van Koller] Next, I would like to take a look at nuclear arms control. South Africa is still prepared to sign the agreement.

[De Villiers] I cannot say what South Africa is prepared to sign. South Africa is prepared to consider signing the agreement, but the nuclear arms control agreement makes provision that if you sign the agreement you would have access to nuclear technology, materials, and facilities without any discrimination. And I believe that at present South Africa does not get equal treatment; I think the reason why the government has not yet decided to sign is because it is cautious about limiting South Africa's free access to nuclear technology.

[Van Koller] What is the present status of our uranium enrichment program? Are we up to par with world standards or are we lagging behind?

[De Villiers] I do not believe we are far behind. There are new technologies developed elsewhere which hold good prospects for less

expensive enrichment, but you must remember that we developed this process about 15 to 20 years ago. The first use of this process was in 1978. To develop new technology from scratch and implement industrial applications takes years. So we developed this plant about 8 years ago based on technology at that time, which was equal to technology used throughout the world. If we were to build another plant in the future, we would investigate other processes.

[Van Koller] Would you like to comment on allegations that our enrichment technology could be used for military purposes?

[De Villiers] Look, any process such as enrichment can be used to produce enriched uranium which could be used militarily. It means that a higher percentage of uranium 235 would have to be used. With the inferior enrichment process which we use, which is about 3 and 1/4 percent enrichment, it is not possible to build a nuclear weapon. But the fact is, if people have the technology, they can apply it to that purpose if they so wish. But our government has stated repeatedly that we are interested in peaceful applications of nuclear energy; in 1984 it also said that South Africa would conduct its nuclear activities in accordance with the letter and spirit of the nuclear arms control agreement and that it would be prepared to negotiate with the IAEA on guarantees on the enrichment process.

[Van Koller] Would we be prepared to discuss nuclear technology with Third World countries?

[De Villiers] Certainly. We have said in our statement that South Africa is still prepared to cooperate with all countries and supply them with material and equipment if there are international guarantees.

/12624

CSO: 5100/4

USSR

MOSCOW TV CITES LONDON TIMES STORY ON ISRAELI NUCLEAR WEAPON

LD072328 Moscow Television Service in Russian 1615 GMT 7 Oct 86

[From "The World Today" program presented by Igor Kudrin]

[Excerpts] Israeli Prime Minister Peres hands over his office in a few days to the current foreign minister, Shamir. Everything seemed to be going smoothly in the already agreed changeover, when suddenly a scandal broke out. Everything began with a sensational publication by the British weekly, SUNDAY TIMES. The world community received confirmation of the fact that for 2 decades Israel has had its own nuclear weapon. Thus Tel Aviv's state secret -- its most valuable secret, as one paper wrote -- became common knowledge in a public and scandalous way.

Israel is hurrying to make some sort of statement, refutations are being written and vows are being made that the Israeli state never intended to use nuclear weapons against the neighbors. Hints are being made that the article in the British weekly is itself doubtful. However, the data in the SUNDAY TIMES are convincing and strictly documented, the pictures and testimony were examined first by experienced experts.

Naturally, Israel was helped to set up this criminal factory in violation of the Nuclear Non-Proliferation Treaty by the Western countries. It is no accident that when U.S. inspectors visited the Negev desert, they did not discover anything. They did not want to find anything. At the time the authoritative special U.S. Congress commission also failed to establish the guilty party in the mysterious explosion in the Indian Ocean in 1979, while everything pointed to Israel. [video shows copy to SUNDAY TIMES, pictures of several installations and control rooms]

/12624

CSO: 5100/3

USSR

COMMENTARY EXAMINES RSA NUCLEAR WEAPONS PROGRAM

LD131105 Moscow Radio Peace and Progress in English 1630 GMT 9 Sep 86

[Unattributed Commentary]

[Text] The London weekly WEST AFRICA warns the racist regime in Pretoria has been having a potential for dealing a nuclear strike for 9 years now. By all appearances, believes the weekly, South Africa held its first nuclear testing on 22 September 1979 when a (?flare) identical to a small nuclear detonation was registered over the South Atlantic. The African countries are now concerned over the implementation of the South African nuclear program, and not without reason either since the Pretoria rulers repeatedly claim (?about) the possibility of using nuclear weaponry. (?they have cynically described them) as contingency weapons in their struggle against other countries and national liberation movements in the continent.

South Africa's magazine OPTIMA reports the country can now produce two atomic bombs from enriched uranium put out by top secret plants in Valindaba, Transvaal Province. However, in the final analysis it does not matter how many bombs and of what capacity can South African racists produce at present, but it needs to be pointed out particularly that the responsibility for the shadow (?of a) nuclear threat now looming over Africa should be shared also by apartheid's imperialist patrons, and first and foremost by the United States who encourages Pretoria's nuclear ambitions. [sentence indistinct] In their hatred for national liberation movements, they are prepared to use this weaponry of mass destruction. And indeed the first South African reactor, Safar'-1, the uranium enrichment plant in Valindaba and the reactors at the (Koeberg) nuclear plant, all these are only among the largest facilities commissioned and now under operation through direct collaboration from Allis Chalmers, Fluor Corporation, and other U.S. companies. Besides the United States supplied South Africa's nuclear installations with enriched uranium. Dozens of nuclear physicists from the United States now work at those installations.

South Africa ranks third in the world in imports of U.S. equipment for nuclear industry. Prominent American scientist (Thompson) believes the Reagan Administration has no intention of disrupting its collaboration with the apartheid regime in nuclear studies, although it continues to refuse to join the Non-Proliferation Treaty, which is again evidenced by the limited sanctions on South Africa imposed by the American President. However, points out the

scientist, there are loopholes left enabling the United States to continue to participate in South Africa's nuclear program. Incidentally, the United States signed a secret agreement with the apartheid regime committing itself to enriched uranium supplies to that country until the year 2007.

Clearly the connivance of the United States and other leading Western powers (?with) apartheid's plans of developing and modifying its nuclear weaponry is fraught with serious threat to peace, both in the region and around the planet. Along with the issue of nuclear arms proliferation, it now falls into the hands of the criminal regime of apartheid [as heard] who continues its policy of terror and violence toward that country's oppressed black majority and aggression on the independent neighboring countries. In this connection, believes the ETHIOPIAN HERALD there is a need for the African nations to rally their unity so as to be able, by concerted efforts, to counter the nuclear blackmail by the Pretoria rulers and their imperialist patrons.

/8309

CSO: 5100/2

USSR

AFP: PLANNED CHERNOBYL-TYPE REACTOR DROPPED

NC141118 Paris AFP in English 1101 GMT 14 Sep 86

[Text] Sept 14 (AFP)--The Soviet Union has dropped plans to build any more Chernobyl-style nuclear plants but will complete work on those under construction. Jacques Valade, leader of a French parliamentary delegation which has just visited the Ukraine, said here Sunday. He said Soviet officials had told him future nuclear plants would be of the pressurised water reactor type.

The Soviet decision follows the April 25 nuclear disaster at Chernobyl 80 miles (130 kilometres) north of Kiev, which pumped clouds of radioactive fallout over much of Europe.

On August 25 Soviet delegate Valeriy Legassov told the International Atomic Energy Agency in Vienna that Chernobyl-type RBMK reactors under construction would be completed, but gave no details about the future of the Soviet nuclear programme.

The French parliamentarians who toured the accident site by helicopter said work on encasing the burnt-out reactor was a "long way" from completion. Soviet experts at Vienna had announced the reactor would be entombed by the beginning of next month. Mr. Valade said local officials could give no date as to when people evacuated from the affected zone around Chernobyl would be allowed to return, and the most optimistic mentioned 30 years as the earliest.

Mr. Valade said the streets of Kiev were still washed down three times a day and urban wastes with higher than normal radioactivity levels were dumped in leakproof trenches. He said Soviet experts feared foodcrops might have absorbed radioactivity through the soil and they were constantly monitored.

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USSR

BRIEFS

TASS: SECRET PLANT IN ISRAEL--London October 5 TASS--A secret underground plant in operation in the Negev Desert has been producing nuclear warheads for twenty years now, the newspaper SUNDAY TIMES reports today. According to the available information, this Israeli plant may have started now the production of thermonuclear armaments of the power vast enough to incinerate big cities, the SUNDAY TIMES points out. [Text] [Moscow TASS in English 2154 GMT 4 Oct 86] /8309

JAPAN WATER LEAKAGE REPORT--Tokyo September 2 TASS--The leakage of radioactive water from the supply system of one of the reactors has taken place at a nuclear power plant in the city of Tsuruga, Japan, 335 km west of Tokyo. A spokesman of the Department of Natural Resources and Energy reported today that in the course of trials at the second power unit with a capacity of 1.16 million kilowatts the air tightness of a water pump was broken. The personnel of the power plant had to stop the power unit immediately. The atomic power plant was to reach capacity by next March. This is the third incident at Japanese atomic power plants for the past month. [Text] [Moscow TASS in English 1621 GMT 2 Sep 86] /8309

U.S. PROTESTORS PENETRATE SITE--New York September 5 TASS--TASS correspondent Igor Makurin reports: A group of peace campaigners from Nevada and Colorado have held a protest demonstration against the incessant U.S. nuclear explosions. They penetrated the territory of the nuclear test site and reached the area of a supposed epicentre of the regular nuclear explosion which is soon to be conducted, according to the plans of the Reagan administration. There they were arrested by the police. They are facing the threat of a long imprisonment and a heavy fine. It was the eighth civil disobedience action in the current year. On the same day four participants in the previous demonstration in the Nevada test site were taken to Las Vegas where they will serve their term. Hal Brody, one of the participants in the demonstration, told TASS by telephone that the purpose of their latest protest demonstration was to call the attention of the U.S. public to the nuclear disarmament problem, to try and force the administration to join the Soviet moratorium on all the nuclear explosions and in this way to block the creation of new nuclear weapon systems. Brody said that he and his comrades regarded the decision of the Soviet Government to stop unilaterally all the nuclear explosions as the most important

Soviet peace initiative and were doing their utmost for making Washington support it. They decided to stage the protest action because they believed that their cause was right, believed in nuclear disarmament. In their opinion, the unwillingness of the congress to support the policy of the administration in the sphere of nuclear explosions, which follows from the recent voting in the House of Representatives and the resolution of the Senate, is an important result of the struggle of the American peace-minded public against the nuclear arms race, for arms control. [Text] [Moscow TASS in English 0634 GMT 5 Sep 86] /8309

CSO: 5100/2

FINLAND

RESEARCHER: CHERNOBYL ACCIDENT COULD HAPPEN EVEN IN FINLAND

Helsinki HELSINGIN SANOMAT in Finnish 5 Sep 86 p 2

[Article by Olli Tammilehto: "Chernobyl Accident Could Be Repeated in Other Reactors"]

[Text] Candidate in Philosophy Olli Tammilehto has written about energy and environmental questions since 1977.

According to Managing Director Anders Palmgren of Pevo or Perusvoima Company, the Chernobyl accident does give not any cause for any notable changes at the nuclear power plants in Lovisa and Olkiluoto since Chernobyl differs completely from the types of plants used in Finland. Palmgren emphasizes that Finland's nuclear power plants are safe even after Chernobyl. This is what the newspapers said in May. Palmgren's colleagues in all countries have made similar statements.

It is a fact that the Soviet Union is the only country that has so-called channel reactors. But does this dissimilarity make them more dangerous than other reactors -- or is it the other way around? Are common traits in nuclear power plants, perhaps, more decisive to the issue of safety than differing characteristics?

Before Chernobyl the engineers at IVO [Imatra Power] and TVO [Teollisuus Power] gave assurances that accidents at large nuclear power plants are in practice impossible. The representatives of other Western power companies have presented the same arguments. But Soviet experts were not to be outdone by those giving assurances.

For example, Soviet Energy Minister Pyotr Neporozhni stated in September 1984: "Nuclear power plants are very economical and they can be built in the immediate vicinity of a city since they do not emit smoke and are completely safe."

Faith in Safety

In addition to the Chernobyl-type channel reactors, pressurized water reactors, which are also the same as those in Lovisa, are to be found in general use in the USSR. Of these two types the Soviets do not consider channel reactors to be any less safe. For example, in Soviet textbooks on the subject

channel reactors are said to be especially suitable for the vicinity of large cities.

Also articles appearing in Western nuclear energy journals before the accident give a positive picture of the safety of channel reactors. What was the basis of this trust?

For example, an important structural difference with respect to Finnish power plants is that instead of a single cooling sphere for all the fuel elements, the channel reactor has its own cooling sphere or channel for each element.

Because of the structure of the channel, it was thought that disturbances would be localized and limited. Since it is possible to remove an individual fuel rod during operation in these reactors, the control of leaks is easier than in more conventional nuclear power plants.

The graphite fire in the Chernobyl Nuclear Power Plant effectively spread nuclear pollutants around Europe. The use of graphite as such as a neutron inhibitor has, however, been considered to increase safety since a large amount of graphite decelerates the development of an accident with its thermal capacity. Thus, generally, there is no containment building for graphite-moderated reactors in Western countries.

However, after the accident the tune of the nuclear power industry in Western countries changed: Chernobyl was exceptionally dangerous.

The most frequent argument was that there was no containment building at the nuclear power plant in Chernobyl. However, it became evident that a containment building at Chernobyl would not have been much help. For example, Jukka Laaksonen, assistant section chief of the reactor safety section in the Radiation Safety Center, admitted on television June 5 that the containment buildings at Lovisa's plants would not have withstood the explosion that occurred in connection with the accident.

The explosive substance at Chernobyl was the mixture of hydrogen and water. Hydrogen can be generated under the conditions of an accident in Finnish power plants also, for example, as overheated zirconium from the fuel can react together with water. In the literature of Western countries dealing with nuclear safety a hydrogen explosion has been considered to be a significant threat, particularly in boiling water reactors, which are being used in Olkiluoto.

A Strong Containment Building

Later it became evident that the information of Western experts on the Chernobyl Nuclear Power Plant was, indeed, lacking or there was an attempt to mislead the public: the Chernobyl Power Plant had a containment building.

This fact came to the attention of the world's press when James Asselstine, a member of the U.S. Nuclear Safety Commission, stated in congressional hearings that there were, in fact, two structures "similar to a containment building"

at the power plant in Chernobyl. They were designed to withstand an excess pressure of 1.86 bar.

The containment building at the power plant in Lovisa is designed to withstand only an excess pressure of 0.868 bar. The containment building is just as weak or even weaker in many American nuclear power plants.

The dangerousness of the Chernobyl Power Plant is also argued by the fact that its procedures functioned differently when the cooling water is lost: in a channel reactor output increases while, on the other hand, output generally decreases in reactors in Western countries. This characteristic is, indeed, an obvious risk factor. Soviet experts have, however, been aware of this risk and they have succeeded in reducing the rate of increase in output in the newer reactors according to certain sources.

Even though the Chernobyl Nuclear Power Plant has risk factors which are not present in the most prevalent types in use in the West, the same also holds true in reverse: accidents which would not have been possible at Chernobyl can happen in so-called light water reactors.

Is Pressure Vessel Strong Enough?

There are two main types of light water reactors: pressurized-water reactors and boiling water reactors. Lovisa has the former and Okilmutz has the latter. In pressurized-water reactors water is heated in a pressure of more than 100 atmospheres so that it cannot boil.

Water boils in the pressure vessel of a boiling water reactor, but it also generates a massive amount of pressure: approximately 10 atmospheres at Okilmutz. A crack in the pressure vessel would be one of the worst imaginable accidents. (There is no pressure vessel in power plants of the thermal type.) If this were to happen, no backup cooling system or containment buildings will help.

No pressure vessel in any nuclear power plant has yet cracked. However, there are many pressure vessels in other types of industry also. They are, in most cases, made of better steel than the pressure vessel at Lovisa, but exactly, since this has been affordable because of their small size. Several 100,000 vessels used in industry have exploded.

Studies conducted in the United States and Europe since the 1960s indicate that a major accident can occur in nuclear power plants in countries of the West. This is, of course, very annoying for those who want to continue the use of nuclear power.

Recently power company representatives and experts have in their turn reported that radioactive emissions in accidents are much less than previous estimates according to the most recent research results. Radioactive iodine would bind itself to the cesium and would, for the most part, remain inside the power plant. No residents in the vicinity would be in any "immediate danger" of an one would come down with any acute radiation illness.

Two important reports used to support arguments to downplay an accident appeared in November 1984. One was the so-called Idcor-report, which was compiled by the nuclear power industry itself, and its purpose was to show that the regulations of officials, which were compiled in the event of damage to the reactor core, can be made less stringent.

The second report, on the other hand, was compiled by the American Nuclear Society or an association of U.S. nuclear power engineers, which corresponds to the Atomic Engineering Society in Finland.

"Forgotten" Data

These reports have been diligently quoted in Finland. On the other hand, it did not occur to IVO's engineers or to so-called independent experts such as Professor of Radio Chemistry Jorma K. Miettinen to tell about a study that came out in April 1985. It was conducted by the American Physical Society and it was funded by the Nuclear Regulatory Commission. According to the study, accident related calculations will contain so many factors of uncertainty that there is no cause to lower assumptions concerning the amount of radioactive emissions.

Official experts also have not told about the test results obtained in leading nuclear engineering research institutes in the U.S. These test results were made public at the end of last year. Sandia National Laboratories and three other laboratories have all come to the conclusion in their tests that iodine will not appear in combination with cesium under the conditions of a nuclear accident. Thus large amounts of iodine can also be emitted into the atmosphere in nuclear power accidents occurring in the West, as has been assumed in the worst case accident scenarios.

Thus nuclear power plants of the Chernobyl type cannot be considered more dangerous than those in use in Finland. Even though certain properties make the control of Soviet channel reactors more difficult than the norm, other differences between them and the Finnish reactors, on the other hand, increase the safety of Chernobyl-type reactors. The properties they have in common are, moreover, more important from the point of view of the dangerousness of nuclear power plants.

Emergency Shut down

Even though a nuclear power plant is shut down or "driven down" in an emergency situation -- for example, in the event of a leak -- the reactor continues to generate heat with a great capacity: radioactive disintegration, which initially generates heat at 6--10 percent of the reactor's full capacity, continues even after the chain reaction splitting uranium nuclei ceases.

Thus several hundreds of megawatts of energy are generated from the reactor or just as much as what is produced by the largest municipal heating plants. These large amounts of water or some other cooling agent must be pumped into a "driven down" reactor also in order to prevent overheating. The pumps, on the other hand, are operated by electricity or steam. If electricity cannot be

obtained from the network or from the power plant's own reserve power generators, a catastrophe is inevitable.

The supervision and control of a nuclear power plant are based on complex electronic equipment. In recent years the Soviet Union has purchased monitoring and control equipment for its nuclear power plants from the West. Probably, some of the instruments at the Chernobyl Nuclear Power Plant were from the West.

One of the weakest links in the safety of a nuclear power plant is materials engineering. Steel and other materials used in the core of a nuclear power plant must in addition to high temperatures and pressures also withstand continuous neutron bombardment, which makes them brittle. Apparently, the capacity to manufacture sufficiently strong steel does not yet exist and, therefore, it is the materials engineering aspect which draws the most criticism from engineers as far as nuclear power is concerned.

In the final count, the safety of all nuclear power plants is based on the fact that the planners, builders, inspectors, and finally the operations personnel act in the expected manner and do not make any major mistakes. However, human errors do occur. Both the Harrisburg and Chernobyl accidents took place in the early morning hours when people commit the most errors according to studies.

Military Needs

If everything said above is true, how is it possible that these risk-prone plants have, in general, been built in our midst? One explanation can be found from the origin of nuclear power technology. The need to be concerned with human safety did not even in the beginning determine the development of nuclear reactors. Military aims dictated the directions of development and, as is well known, the first concern of military men is not the preservation of human life.

The type of reactor used at Lovisa was originally developed in the United States for nuclear submarines. The most important factor was its light weight -- and not safety.

The Chernobyl-type channel reactor as well as the Western graphite-moderated reactors were originally developed for the production of plutonium used in bombs. The most important factor was to reduce the production costs of raw material for nuclear weapons -- and not to be concerned with safety.

19876

CSO: 5100/2574

FINLAND

PROBLEM AT LOVISA REACTOR DESCRIBED

Helsinki HELSINGIN SANOMAT in Finnish 5 Sep 86 p 13

[Article: "Water Leak at Lovisa Number 2 Plant Was Threatening"]

[Text] The Radiation Safety Center describes the situation that occurred at the Lovisa number 2 plant on Wednesday as threatening. A valve defect, which halted the start-up of the power plant, was in the primary sector of the power plant, in which water is in direct contact with the nuclear fuel. The situation was rescued by the fact that the defect was quickly corrected.

Imatra Power will also have to stop the unit one power plant in Hastholmen. The reason for the interruption of electric production is an extraordinary sound coming from the main circulation pump.

The pump cannot be inspected unless the plant is shut down. The repair or replacement of the pump will require the shut-down of the whole plant, and the duration cannot for the time being be estimated.

Ten Cubic Meters of Water Lost

In the valve leak on Wednesday in the number two unit approximately 10 cubic meters of the primary sector's 250 cubic meters of water leaked out. According to the information disclosed on Thursday, the water was collected into the plant's internal collection system and there was no immediate danger from the leak to personnel or to people outside of the plant.

The amount of radiation in the water leaked was 200,000 Becquerel rays per liter or 10 times more than the highest radiation dosages confirmed in food products.

Cause of Defect Not Yet Found

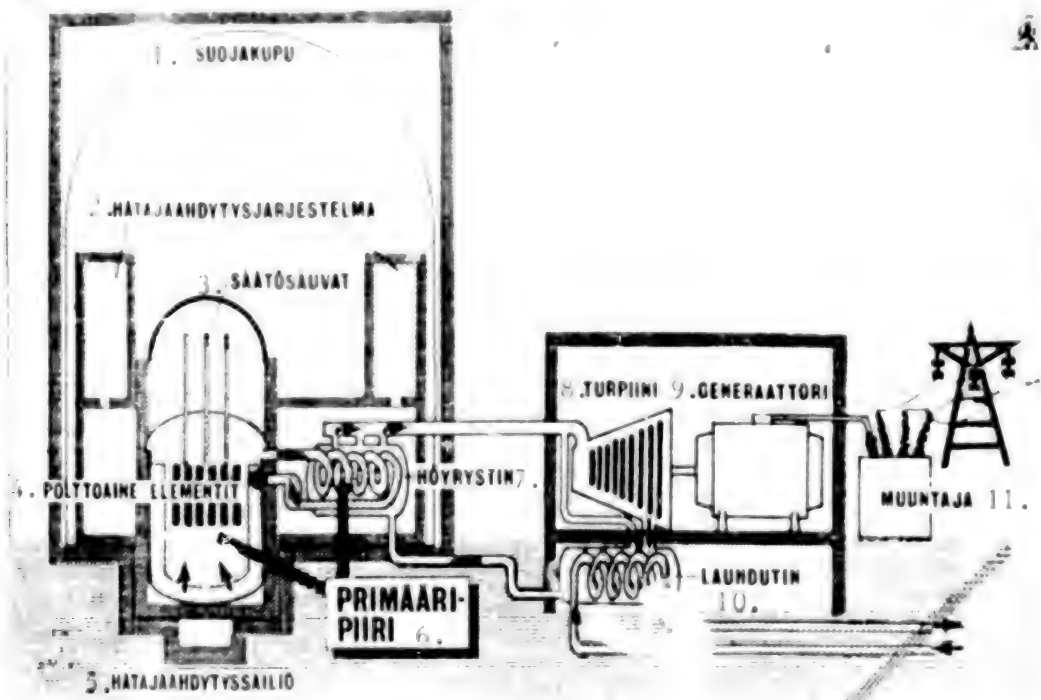
There were several inspectors present from the Radiation Safety Center when the accident occurred at Lovisa. Inspectors are usually at the plant during repair and maintenance operations as well as when nuclear power plants are put into operation. Now the officials received notification of the incident from their own sources sooner than it is given by Imatra Power.

According to Jussi Helske, operations chief of Imatra Power's Lovisa Plants, the valve defect has not yet been completely clarified. Imatra Power will compile a report on the defect for the the Radiation Safety Center, and the number two plant cannot be put back into operation until after the report.

In 1980 the number one plant at Lovisa was shut down for 7 months because of defects and inspections.

More electricity than normal will have to be produced from Inkoo's coal-fired power plants. Teollisuus Power's two nuclear power plants at Olkiluoto are operating normally.

The maintenance and repair work on nuclear power plants have usually been timed for the summer since the consumption of electricity is at its lowest at that time. Now this work has been postponed until the fall because of the spring strikes in the electric industry.



The valve defect was in the nuclear power plant's primary sector, in which water was in direct contact with the nuclear fuel.

Key:

- | | |
|--------------------------------|-------------------|
| 1. Protective dome | 6. Primary sector |
| 2. Emergency cooling system | 7. Evaporator |
| 3. Control rods | 8. Turbine |
| 4. Fuel elements | 9. Generator |
| 5. Emergency cooling reservoir | 10. Condenser |
| | 11. Transformer |

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CSO: 5100/2574

FRANCE

SAFETY FROM CHERNOBYL TYPE ACCIDENTS QUESTIONED

Orsay (Paris) LA GAZETTE NUCLEAIRE in French Jul/Aug 86 pp 20-24

[Unattributed Article: "Is an Accident Similar to Chernobyl Possible in France?"]

[Excerpts] For many years -- one might say forever -- nuclear power officials (the "nucleocrats") have proclaimed that our nuclear technology was so good, that our EDF [French Electric Company] personnel were so well trained, etcetera...., that an accident was absolutely impossible, or at least highly unlikely. And in any case, assuming that...., our system of successive barriers should prevent any discharge outside the reactor structure.

Now, several comments can be made:

- The Americans at TMI [Ten Mile Island], with BWR reactors (thus different from ours, true, but that does not alter anything for our purpose), also had containment fears but this did not keep them, in a situation much less catastrophic than at Chernobyl, from allowing the escape of emissions, specifically into the atmosphere.

- The Soviets, on the other hand, did not have a containment shell: not because they are less intelligent, or more stingy, than others, but because "theoretically" their reactor design should not have posed the kind of problem which arose. Besides, have you seen a containment shell over our own power stations of the Uranium-Graphite-Gas system, the design of which is rather similar to that of the USSR system?... Now, against all expectations, that which should "theoretically" not have happened did happen and, 3 weeks later (as the Americans did at TMI), the Soviet experts are still wondering how this could have happened! The fact remains that the "escape" into the atmosphere was what we know!...

- Are we really certain that in case of an "unmeasurable accident," as they say in France to refer to a possible major accident, there could not be an unexpected mechanical explosion of unspecified origin within the reactor structure, which would then be likely to damage the containment shell, hence the last "barrier"? As far as that famous containment shell is concerned, one would like to know for how long it would be able to contain the products freed by a major accident, assuming no initial deterioration caused by an explosion. All those hypotheses on containment are a heavy burden, as we will

see, on the validity and effectiveness of the emergency plans because this problem of controlling the containment directly affects the time available to act at the level of the population.

- For those who might be completely convinced that we are safe from an accident in France, we invite you to read carefully the following story on the incident which took place at stage No5 of the BUGEY on 14 April 1984, about which the official report notes that "it was undoubtedly the one incident which came closest to being a serious accident since the start of the first stage of the French REP park...

However, some evolution does seem to have taken place since Chernobyl in the state of mind of our nucleocrats: as this accident followed the one at TMI in the USA a few years ago, it would seem more and more difficult to argue that we are always more intelligent than the others -- at a maximum, it could still be said that perhaps we are the luckiest! Consequently, it is with some "relief" that we are beginning to hear a more realistic and more modest language as, at present, they no longer deny that an accident could happen in our country, even if at the same time they are still telling us that the consequences would be absolutely minimal... That remains to be seen! In any case, we said "relief" in view of this evolution because -- finally! -- they will perhaps stop treating people like imbeciles by hiding information from them, and perhaps take the imperative serious steps to improve preventive measures in all areas, from technical security studies to the establishment of "emergency plans" worthy of that name.

What Are the Emergency Plans Worth in Terms of Evaluating the Transfer of Radioactivity?

A very worrisome problem is that of the atmospheric dispersion of radioactivity and thus of its radiological consequences. In November 1985, at the IAEA (International Atomic Energy Agency) colloquium on "Planning and the State of Preparedness for Emergency Situations in Nuclear Installations," the French officials (Mr Scherrer from SCSIN [Central Service for Nuclear Installation Safety] and Messrs Evrard and Ney from the AEC's IPSN) stated the following (excerpt from the text of their presentation "Technical Organization of the Security Authorities in Case of an Accident in a Nuclear Installation"):

[...] "An effort is currently under way at IPSN to provide the crisis teams with specific and adapted means allowing them to fulfill their mission, both in terms of evaluating the transfer of radioactivity and of preventing possible releases at the time of an accident in a nuclear installation."

"Atmospheric dispersion of radioactivity and radiological consequences."

"For numerous years now, this problem has been the object of the development of rather complete resources. Operational charts of atmospheric transfers, based on a gaussian distribution model, have been drawn up and have been the object of a consensus among the various public bodies concerned. On the other hand, they are currently working on computerized resources using a gaussian bursts model and allowing consideration of variations in the emission flow

and the conditions of dispersion (speed and direction of the wind, atmospheric stability) and subsequently the orography of the site." [...]

The fact can already be appropriately evaluated that after more than 10 years of nuclear programming, and while about 40 stages are in operation, "an effort is currently under way at IPSN in order to provide..."! But we are going to examine the real situation in the matter and thus see the current state of the issue.

Short Distance Atmospheric Diffusion Tables

Nuclear power stations are equipped with graphics and special tables (called "abacuses") intended to estimate the location of fall-out from the cloud emitted in case of an accidental release. The documents have been drawn up on the basis of experiments on specific sites, primarily flat, and have been standardized for all power station sites. They operate on the basis of emission data and local meteorological conditions measured at the 80 meter level.

Several comments are necessary here:

- The range of validity of those tables covers only a distance of about 10 kilometers around the source, which is very small: with a wind of 5 meters per second for example (very common), the gaseous effluents would cover that distance in less than 45 minutes! It is hard to see how any decision could be made... and implemented (!) in that short a period of time...
- Given their "standard" nature, those tables are more or less valid for those sites whose configuration is in the neighborhood of those where the experiments were conducted, that is to say for virtually flat sites. But, as everyone knows by studying the list of sites of French power stations, very few of them are located in a flat region. And it so happens that on a terrain with somewhat complicated topography, the conditions of air diffusion can present a few surprising aspects! The Americans for example have carried out precise experiments on some of their sites and have established that in the presence of relief, and with weak winds (thus not very organized in terms of direction), fall-out could be found a bit everywhere, and for longer periods of time than had been anticipated. It seems that in France, experiments of this kind have been started only recently, on a small scale.
- According to some information it would seem that there are unfortunate stories of "private reserves" between the AEC-EDE, who have developed the "operational abacuses" available at the power stations, on the one hand, and SCPRI [Central Service for Protection Against Ionizing Radiation] which has its own and would not want to hear about any others, on the other hand...

Propagation of Effluents on Regional Scale

The above mentioned comments show the fragility and inadequacy of the operational resources provided to estimate the trajectory of a possible radioactive release in the immediate vicinity of the power stations. But beyond that distance of about 10 kilometers, it is even worse when one tries to estimate what

is going to happen between approximately 10 and 200 kilometers from the power station ("regional" scale). And yet that zone is vital because it is the one that would be involved in case of the evacuation of people, and, if one accepts the idea that the releases could be contained for a certain period of time in the containment shell, then it is indispensable to be able to decide on the "best" moments (or rather the least bad...) to effect delayed releases. But, what do we see?

- It is only rather recently that the EDF Research Services have started developing calculation models at the regional scale which take into account the relief. Very obviously, those studies are still rather far from leading to concrete operational procedures of the same style as the procedure existing for "short distances."

- These models require, for validation and for delayed or direct computer use, very diversified meteorological data from field sources of relatively significant density. But the resources thus needed are voluntarily limited, not only for reasons of costs, but also for "diplomatic-psychological" reasons: how can you consider, for example, the installation of a few small stations for additional measures in our regions -- if not, and this is worse, on the other side of the Swiss border for Creys-Malville -- if you state very loudly that our containment shells are fully up to the mark and hence that there is no risk at all...

The only meteorological measurements carried out on site (wind at 80 meters, characteristics of the lower strata of the atmosphere by depth sounder called SODAR, atmospheric pressure of a rather doubtful usefulness as a matter of fact) were made at the request of the security bodies and of SCPR (by the famous Professor Pellerin), which require EDF to automatically and directly send all those data to the regional meteorological centers: but the latter merely store them (they do nevertheless increase the potential of the meteorological network), because up to now they have neither the mission nor the means of exploiting them usefully within the framework of operational regional control in real time. And EDF is also very happy to get rid of the baby...

Long Distance Transfer of Effluents

The Chernobyl accident has highlighted the importance of meteorology on a regional scale -- we have just talked about that -- but also on a continental scale! Everyone could see it: as the radioactive cloud naturally ignored the borders, the European countries were caught completely off guard and were able only... to take note of the damage on their own territories. In case of a setback or failure, followed by release, at one of our 40 or so areas, would we be better equipped to inform -- and quickly -- our neighbors of an undesirable cloud possibly passing over their territory? Well, no, our equipment for long distance transfer is even worse than on the regional scale. One might even wonder whether it is considered a real problem at EDF: it is true that the latter has recently made a deal with the national meteorological office to purchase a whole set of regular data covering France -- but only France, and it is not necessary to have data at hand on a European scale -- which are, in fact, available from specialized meteorological centers.

Ultimately, this question of a transfer into the atmosphere of a possibly significant radioactive release requires several comments:

- No work is currently being done on developing a homogeneous and complete procedure which would make it possible to handle the problem of estimating what would become of a cloud emitted by a power station.
- Generally speaking, meteorology has always been somewhat neglected in the emergency plans (the example of Chernobyl shows us the vital importance of this factor): at most, it has been provided that a meteorology expert will be added to the release team within the framework of the ORSEC [Disaster Relief Organization]-RAD plan.
- For various reasons the division of labor is skilfully maintained, both within EDF among the various directorates, operations, research, etcetera... and between the EDF and other bodies: AEC, national meteorological office, SERPI, etcetera... This situation seems very prejudicial to us, both in terms of research to improve safety or security conditions in all areas, and in terms of the effectiveness of the emergency plans.
- The question of centralizing all technical data of all kinds (including meteorology, operational calculation models, etcetera) in a decision making center is still open; this would be in a location other than the power station itself (it would be hard to imagine a crisis command post seriously operating in a power station which has experienced a serious accident...).

Have There Been Other Accidents?

A large number of problems have existed with experimental reactors. One of them is of the same type: fire of the graphite. It took place at Windscale in 1957 in England.

At that time the effects were minimized; we had to wait 20 years before the reports appeared: they really provided an inventory of the products which left the core, and the long term consequences are being studied.

As far as accidents in large units are concerned, there was TMI in 1979 and Chernobyl in 1986. As for the rest, well the future will tell us.

On the other hand, Chernobyl has recalled the memories of the fall-out of the atmospheric explosions in the sixties. In France we were able to note that on 1 May the cloud sent us 1000 times more cesium than the fall-out of those explosions. True, spread over the whole year it will not amount to much, but it is nevertheless too much.

Are There Reactors in France Without Containment Shell?

Obviously there are the gas graphites; we have four of them left: one at Chinon, in the process of being repaired (Chinon A3), two at St. Laurent des Eaux (St. Laurent A1 and A2), one at Bugey (Bugey 1).

The first one is not of an integrated type: which means that the vessel does not contain the heat exchangers. On the other hand, the three others have a cooling circuit so that the pressurized carbon dioxide does not leave the vessel, which contains the core and the exchangers.

It is true that those reactors are enclosed in a vessel but there is no supplementary containment shell around the reactor. Now, the upper plate is full of holes to allow the reactor to be loaded and unloaded without stopping it. It is the system which makes it possible to obtain military quality plutonium, as is also possible with the Russian reactor.

Appendix

Actions Taken in France Following TMI

Following the publication of the Bugey incident, which typically reflects not taking into account of the lessons of TMI, EDF came up with a magnificent dossier on the subject.

There are a few bright spots.

"... Since the beginning of April 1979, a working group was created to identify actions..."

"... It should be noted that the security analysis which was carried out has not brought to the fore any anomaly that might interrupt or delay the putting into service of the 900 megawatt units under construction at the time, or to stop the units in operation (Fessenheim, Bugey)."

"... At present, the detailed balance sheet of the actions is as follows:

- for the 900 megawatt units, the studies have been completed and 90 per cent of the modifications have been made. The remainder will be almost completely finished by the end of 1986. Their implementation will have cost on the order of 1 billion francs;
- for the 1,300 megawatt units, all the actions have been completed (because the first units were just in the first stages of construction in 1979 and the studies were able to take the effects of TMI into account immediately);
- for later units, the action plan as a whole is taken into account from the time of conception."

"In late 1985, the security authorities approved all the results of the French action plan and it may be considered completely finished."

Commentary

A nice example of EDF publicity for the benefit of the media and the public.

However, reality is quite a bit different.

At the time of the June 1985 session, the CSSN examined those famous lessons of experience. And what did they find?

1. Problem in Energy Power Supply System

Various incidents took place:

- . 1-11-1983: Graveline 4, jamming of a piston.
- . 2-10-1983: Bugey 3, rupture of two tappet push rods.
- . 4-21-1983: Dampierre 4, jamming of a piston.
- . 8-15-1983: Cruas 1, rupture of a connecting rod.
- . 11-28-1983: Blavais 3, rupture of a fuel injection pipeline.

And if you consider the Bugey 5 incident of April 1984, the importance of the emergency supply system is obvious. At the request of the security authorities, EDF must add additional equipment for gas turbines. The progress of the implementation, described by SCSIN in June 1985 was:

"... There is a gas turbine on every 90 megawatt site. For the 1,300 megawatt sites, the French Electric Company is considering the strategy to follow: one turbine per site or per region which could be put into place quickly."

...and if that is not enough, they will make the center's personnel pedal generators!!!

2. Implementation of Security Measures

"... to send me a certain number of files about nine specific points: eight of those files did not get to me."

This refers to a 1984 request and the letter is dated 1985. As they are requesting them to be sent within 3 months, one would like to know in 1986 whether those famous files finally did arrive.

3. Delays in Completion

The SCSIN wrote to EDF:

"With regard to delays in completion, I have noted that your company has difficulties in quickly implementing certain modifications of the units"...

And, who chooses? EDF or the security authorities?

And better, the SCSIN also wrote:

"Finally, I have noted that your company has difficulties in taking my requests into account; those difficulties are translated into delays in taking them into account, if not a lack of taking them into account."

We are forced to comment that EDF may always continue to state that the post TMI period has been useful to them. To produce papers, surely, to make improvements, that remains to be seen.

A series of incidents:

- * were due to non-hierarchical alarms: thus the employees do not, as a matter of fact, know what has broken down;
- * were due to confusions of units: the grouping of the facilities is studied so well that the employees got the wrong unit when they wanted to carry out a maneuver;
- * were due to the fact that no attention was paid to previous incidents.

Last quote:

"Ill-timed opening of the RRA's rate control valves. I would like you to specify, within less than 6 months, the steps to be taken so that the location of those valves is known at all times, at least locally."

Well bravo, for having reached the point, in June 1985, of asking to know the exact location of the valves.

In 1979, that was precisely one of the causes of the accident at TMI: the monitor in the machine room signaled that the order had been given but did not give the location.

Six years later, this letter allows us to understand that we are still at the same point!

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CSO: 5100/2578

END

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NOV. 21, 1986